IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

WIRTGEN AMERICA, INC.,	)	
	)	
Plaintiff,	)	
	)	
v.	)	C.A. No. _____
	)	
CATERPILLAR INC.,	)	**JURY TRIAL DEMANDED**
	)	
Defendant.	)	

COMPLAINT

Wirtgen America, Inc. ("Wirtgen America") files this Complaint for patent infringement against Caterpillar, Inc. ("Defendant" or "Caterpillar"). Wirtgen America filed a Complaint against Caterpillar and four other Caterpillar subsidiaries in the United States District Court for the District of Minnesota on June 15, 2017. Wirtgen America also now files suit in this District where Caterpillar resides due to venue considerations arising from the recent decision in *TC Heartland LLC v. Kraft Foods Group Brands LLC*. Wirtgen America states as follows:

THE PARTIES

1. Wirtgen America, Inc. is a Tennessee corporation with its principal place of business at 6030 Dana Way, Antioch, Tennessee 37013-3116. Wirtgen distributes, *inter alia*, cold milling machines throughout the United States.

2. On information and belief, Caterpillar, Inc. is a Delaware corporation with its principal place of business at 100 NE Adams Street, Peoria, Illinois 61629.

3. On information and belief, Caterpillar Inc. is the parent company of Caterpillar Prodotti Stradali S.r.L, Caterpillar Bitelli SpA, Caterpillar Americas CV, and Caterpillar Paving Products, Inc.

JURISDICTION AND VENUE

4. This Complaint for patent infringement arises under the patent laws of the United States, Title 35, United States Code, and this court has jurisdiction over those claims pursuant to 28 U.S.C. § 1338, which directs that United States District Courts shall have original jurisdiction of any civil action arising under any Act of Congress relating to patents, and pursuant to 28 U.S.C. § 1331, which pertains to civil actions arising under the laws of the United States.

5. Personal jurisdiction and venue over Caterpillar are proper in this District because Caterpillar, a Delaware corporation, resides in this district.

FACTS

Overview

6. Since opening its headquarters in the Nashville, Tennessee in area 1985, Wirtgen America has been an innovator in the heavy equipment sector, and has established itself as "a powerhouse of economic input" in both the local and national economies. (*See* Exhibit 1, 2016 Nashville Chamber of Commerce Article, "*Wirtgen America Contribution and Impact Analysis*".) For over 30 years, Wirtgen America's business has centered around the advancement, education, and implementation of cold milling technology within the United States.

7. Cold milling technology, and the road milling machines implementing this technology, offer a solution for quickly and efficiently rehabilitating road surfaces. Wirtgen America's road milling machines have been overwhelmingly adopted in the road resurfacing industry because of their superior performance. In fact, Wirtgen-brand road milling machine sales have long since accounted for a large majority of the U.S. market.

8. The market success and superior performance of Wirtgen America's road milling machines are byproducts of the technological innovations of Wirtgen America and its related entities over the past several decades. These innovations began with Wirtgen America's affiliated company, Wirtgen GmbH, developing its first cold milling machine for road resurfacing in 1979, and have been continued by Wirtgen America through today.

9. Wirtgen America owns several patents covering various aspects of its innovative road milling machines, including those asserted in this Complaint ("Asserted Patents"). The Asserted Patents are directed towards key features that have been incorporated into Wirtgen America's road milling machines that include, for example, the Wirtgen W 200i, W 200 Hi, W 210i, W 220, W 220i, W 250i, W 2200, W 50, W 50 Dci, W 50 Ri, W 60 Ri, W 60i, W 100i, W 100 Fi, W 120 Fi, W 100 CFi, W 120 CFi, W 130 CFi, W 150i, and W 150 CFi. These features have contributed to Wirtgen's success and have allowed Wirtgen to establish itself as not only a market leader, but also as a respected educator within the road resurfacing industry. The Wirtgen model W 200i pictured below is exemplary of the Wirtgen cold milling machines.

10. In contrast to Wirtgen America, Caterpillar has historically been only a minor player in the U.S. road milling industry—having a market share of less than 10%. But recently, Caterpillar decided to refocus its efforts and emphasize the U.S. road milling market. On information and belief, Caterpillar's recent shift in philosophy was sparked by a desire to capture Wirtgen America's market share. On further information and belief, Caterpillar's decision coincided with Caterpillar's purchase, and subsequent analysis, of a Wirtgen-brand road milling machine. On yet further information and belief, following Caterpillar's dissection of the Wirtgen-brand road milling machine, Caterpillar began importing certain road milling machines that included Wirtgen America's patented technology, the PM600 Series (e.g., PM620 and PM622 models) and the PM800 Series (e.g., PM820, PM822, and PM825 models) (collectively, the "Infringing Products"), into the United States.

Wirtgen America's Patents

11. Wirtgen America is the owner of six patent families comprising twelve patents being asserted in this action.

Count	Family	U.S. Patent
1	Four-way Full Floating	7,828,309
2		8,118,316
3	Driving Backwards	7,530,641
4	Path Measurement	8,113,592
5		9,010,871
6		9,656,530
7	Sensor Switching	8,308,395
8		7,946,788
9		8,511,932
10		8,690,474
11	Auxiliary Drive	9,624,628
12	Pivoting Scraper	9,644,340

12. Wirtgen America is the owner of U.S. Patent No. 7,828,309 ("the '309 patent"), entitled "Road-building machine." The '309 patent is generally directed to road-building machines that have a chassis with four ground engaging supports and four working cylinders connecting the ground engaging supports whereby coordinated height adjustment of the ground engaging supports provides improved stability and improves milling quality. A copy of the '309 patent is attached hereto as Exhibit 2.

13. The inventions disclosed and claimed in the '309 patent are road-building machines as described above wherein the working cylinders are positively coupled to one another such that, for example, the left front wheel or track and the right rear wheel or track are adjusted in height in the opposite direction to the right front wheel or track and left rear wheel or track, the left front wheel or track and the right rear wheel or track being adjusted in height in the same direction. Thus, these machines essentially operate using a floating mount of both the front and rear axle, thereby improving the compensation of both transverse inclination of the road-

building machines and unevenness in their longitudinal direction. Consequently, the permissible height of an obstacle which can be driven over by only one wheel of the machine is significantly increased.

14. Wirtgen America is the owner of U.S. Patent No. 8,118,316 ("the '316 patent"), entitled "Operational methods for a road-building machine." The '316 patent is a continuation of the '309 patent and is generally directed to methods of operating the road-building machines described in the '309 patent. A copy of the '316 patent is attached hereto as Exhibit 3.

15. Wirtgen America is the owner of U.S. Patent No. 7,530,641 ("the '641 patent"), entitled "Automotive construction machine, as well as method for working ground surfaces." The '641 patent is generally directed to road-building machines with a monitoring device that senses the distance between the milling drum and the ground surface and, when the machine is traveling in the same direction of the rotation of the milling drum, triggers a safety mechanism to prevent contact of the milling drum with the ground surface. A copy of the '641 patent is attached hereto as Exhibit 4.

16. The inventions disclosed and claimed in the '641 patent are road-building machines as described above wherein the monitoring device, upon sensing potential engagement of the ground surface by the rotating milling drum while raised, uncouples the raised milling drum from the drive engine and/or uncouples the traveling devices from the drive engine and/or raises the machine frame and/or generates an alarm signal. Thus, the milling drum can remain coupled with the drive engine throughout an operation, even when not working the ground surface, without risk of the milling drum being damaged or the road-building machine being accelerated suddenly and uncontrollably upon inadvertent engagement of the milling drum with the ground surface. This reduces the time required for working a pre-determined ground space

by avoiding the need to uncouple the milling drum from the drive engine before traveling in reverse, bring the drive engine down to idle speed to recouple the milling drum, and then bring the drive engine back to operating speed after recoupling.

17. Wirtgen America is the owner of U.S. Patent No. 8,113,592 ("the '592 patent"), entitled "Automotive construction engine and lifting column for a construction engine." The '592 patent is generally directed to road-building machines with measuring devices that determine the height of the machine frame relative to the ground engaging supports by measuring the lifting state of the lifting columns connecting the machine frame to the ground engaging supports. A copy of the '592 patent is attached hereto as Exhibit 5.

18. The inventions disclosed and claimed in the '592 patent are road-building machines as described above wherein each height-adjustable lifting column is provided with a measuring device for measuring the current lifting state of the lifting column, the measuring device is coupled with elements of the lifting column in such a manner that a path signal pertaining to the lifting position of each column is continuously detectable by the measuring device, and that a controller receiving the measured path signals from the measuring devices regulates the lifting state of the lifting columns. Thus, the invention provides for positions of the lifting columns to be adjusted in a regulated manner.

19. Wirtgen America is the owner of U.S. Patent No. 9,010,871 ("the '871 patent"), entitled "Automotive construction machine, as well as lifting column for a construction machine." The '871 patent claims priority to the '592 patent and is generally directed to the same subject matter. The inventions of the '871 patent include both automotive construction machines and methods of using such machines. A copy of the '871 patent is attached hereto as Exhibit 6.

20. Wirtgen America is the owner of U.S. Patent No. 9,656,530 ("the '530 patent"), entitled "Automotive construction machine, as well as lifting column for a construction machine." The '530 patent claims priority to the '592 patent and is generally directed to the same subject matter. The inventions of the '530 patent are directed to automotive construction machines. A copy of the '530 patent is attached hereto as Exhibit 7.

21. Wirtgen America is the owner of U.S. Patent No. 7,946,788 ("the '788 patent"), entitled "Road construction machine, leveling device, as well as method for controlling the milling depth or milling slope in a road construction machine." The '788 patent is generally directed to road construction machines with a leveling device provided with an indication and setting device capable of indicating and altering the data of a current or pre-selected sensor of milling depth or slope and a switchover device capable of switching over from the current sensor to the pre-selected sensor during the milling operation without any repercussion on the work result. It is also directed to methods of using the same. A copy of the '788 patent is attached hereto as Exhibit 8.

22. The inventions disclosed and claimed in the '788 patent are road-building machines as described above wherein the leveling system comprises a plurality of selectable sensors for sensing milling depth and/or slope, a controller operable to control the milling depth and/or slope based on set values and sensed current actual values, and a switchover device operable to switch over from control based upon a first subset of sensors to a second, different subset of sensors without affecting the milling operation. This avoids faults in the work result or, alternatively, the need to halt the milling operation in order to switch the sensors being used to maintain a particular milling depth and/or slope, which itself can cause an adverse effect when the milling drum cuts clear while standing.

23. Wirtgen America is the owner of U.S. Patent No. 8,308,395 ("the '395 patent"), entitled "Automotive construction machine, as well as method for working ground surfaces." The '395 patent claims priority to the '788 patent and is generally directed to the same subject matter. A copy of the '395 patent is attached hereto as Exhibit 9.

24. Wirtgen America is the owner of U.S. Patent No. 8,511,932 ("the '932 patent"), entitled "Automotive construction machine, as well as method for working ground surfaces." The '932 patent claims priority to the '788 and '395 patents and is generally directed to the same subject matter. A copy of the '932 patent is attached hereto as Exhibit 10.

25. Wirtgen America is the owner of U.S. Patent No. 8,690,474 ("the '474 patent"), entitled "Automotive construction machine, as well as method for working ground surfaces." The '474 patent claims priority to the '788, '395, and '932 patents and is generally directed to the same subject matter. A copy of the '474 patent is attached hereto as Exhibit 11.

26. Wirtgen America is the owner of U.S. Patent No. 9,624,628 ("the '628 patent"), entitled "Auxiliary drive." The '628 patent is generally directed to construction machines for the treatment of ground surfaces that have a work drum driven by a work motor via a transmission including a belt drive and a reduction gear. An auxiliary drive can be coupled to the work drum via at least a portion of the transmission to rotate the work drum. A copy of the '628 patent is attached hereto as Exhibit 12.

27. The inventions disclosed and claimed in the '628 patent are construction machines as described above wherein the auxiliary drive remains mounted to the construction machine and has at least two configurations, one in which the auxiliary drive motor is coupled to the work drum and one in which the work drum can be rotated by the work motor. This can

reduce the required time for the exchange of the tools of the work drum because the auxiliary drive can be actuated by the operating person at the site of the work drum.

28. Wirtgen America is the owner of U.S. Patent No. 9,644,340 ("the '340 patent"), entitled "Scraper device, as well as construction machine." The '340 patent is generally directed to construction machines with a two-part scraper blade arranged in a height-adjustable fashion behind a milling drum, wherein the scraper blade is attached, at the upper end, to swivel about a swiveling axis parallel to the axis of the milling drum. A copy of the '340 patent is attached hereto as Exhibit 13.

29. The inventions disclosed and claimed in the '340 patent are construction machines as described above wherein the scraper blade is swiveled about the swiveling axis by extension of a swiveling actuator connected between the upper part of the scraper blade and a fixed part fixed relative to the machine frame. This arrangement enables both a large swiveling angle and a small swiveling radius, thereby realizing a low design height and saving space.

Caterpillar's Infringing Products

30. Since the introduction of the Infringing Products, Caterpillar has coordinated the importation of at least thirty-three (33) units of the Infringing Products into the United States. U.S. Customs import records indicate that twenty-two (22) PM 622 machines have been imported into the United States between May 8, 2016, and November 17, 2016. (*See* Exhibit 14, Panjiva Import Records.) Those records further indicate that thirteen (13) PM 620 machines have been imported into the United States between April 29, 2016, and October 31, 2016. (*See* Ex. 14.)

31. Upon information and belief, Caterpillar Prodotti Stradali S.r.L. ("Caterpillar Prodotti Stradali") manufactures and sells the Accused Products for importation into the United

States. For example, Caterpillar Prodotti Stradali manufactures cold planer machines and is based in Minerbio, Italy. (*See* Exhibit 15, Bloomberg.com company overview of Caterpillar Prodotti Stradali.)

32. Caterpillar Prodotti Stradali was formerly known as Bitelli SpA before changing its name to Caterpillar Prodotti Stradali as a result of its acquisition by Caterpillar Inc. (*See* Ex. 15) Import records show that Caterpillar Bitelli SpA ("Caterpillar Bitelli") and Caterpillar Prodotti Stradali operate out of the same address, 2 Via IV Novembre in Minerbio, Italy. (*See* Ex. 15.) On information and belief, Caterpillar Prodotti Stradali and Caterpillar Bitelli are one and the same.

33. Caterpillar Bitelli and Caterpillar Americas import the Infringing Products into the United States. U.S. customs import records indicate that Caterpillar Bitelli was the shipper of eight (8) PM 622 machines and two PM 620 machines and that Caterpillar Americas was the shipper of one (1) PM 620 machine. (*See* Ex. 14.)

34. Caterpillar Paving Products facilitates importation of the Infringing Products. U.S. customs import records identify Caterpillar Paving Products as the consignee of eleven (11) PM 622 machines and two (2) PM 620 machines. (*See* Ex. 14.)

35. Caterpillar Paving Products further distributes the Infringing Products in the United States after importation. UCC filings indicate that it sold at least nine (9) PM 622 machines between June 15, 2016, and March 29, 2017, and at least three (3) PM 620 machines between June 28, 2016 and March 16, 2017. (*See* Exhibit 16, UCC Filing Records.) Furthermore, the badge on a PM622 observed near El Paso, Texas indicated that the PM622 was made in Italy and distributed by Caterpillar Paving Products Inc.

36. On information and belief Caterpillar Inc. directs and coordinates the activities of Caterpillar Prodotti Stradali, Caterpillar Bitelli, Caterpillar Americas, and Caterpillar Paving Products, including the importation into the United States of the Infringing Products. U.S. import records identify Caterpillar Inc. as the global headquarters for each importation discussed above. Furthermore, Mr. Paul Clark's LinkedIn page at https://www.linkedin.com/in/paul-clark-b25107a/ holds him out as the Global Product Manager of the Caterpillar Paving Products Division of Caterpillar Inc. It explains that he has "[f]ull P&L responsibility for Caterpillar's soil compaction and asphalt product lines headquartered in Minneapolis with manufacturing facilities in Minnesota, Italy, and China." In a recent video interview discussing the machines at issue in this action, available at https://www.youtube.com/watch?v=x1GGsaIgFPE, Mr. Clark is also held out "General Manager of Global Paving Caterpillar."

His business card lists his title as WW Products Manager-Paving Products with his address at Caterpillar Inc., 11601 93rd Avenue North, Maple Grove, Minnesota 55369.

CATERPILLAR®

Paul J. Clark
WW Product Manager-Paving Products
Earthmoving Division

Caterpillar Inc.
11601 93rd Avenue N
Maple Grove, MN 55369 US

Office: (763) 315-5544
Fax: (763) 315-5524
Cell: (309) 253-2754
Clark_Paul_J@cat.com

37. On information and belief, Caterpillar Inc. maintains a location at the 11601 93rd Avenue North, Maple Grove, Minnesota 55369 listed on Mr. Clark's business card. A 2010 article in the Minneapolis/St. Paul Business Journal states that "Caterpillar Inc. will lease 117,000 square feet of warehouse space in Maple Grove" at "11601 93rd Ave. N, near Highway 81." (*See* Exhibit 17.) On further information and belief, Caterpillar Inc.'s Maple Grove facility serves as a marketing facility for Caterpillar Paving Products' machines, including infringing products, complete with a 60,000-square-foot showroom/warehouse. (*See* Exhibit 18, NELSON

website printout.) Caterpillar Inc. has at least one infringing product, a PM620 machine, on display at this facility, as demonstrated by the photos below, taken standing outside the facility on May 29, 2017. (MG_4929.JPG and MG_4931.JPG; *see* Exhibit 19, Affidavit of Michael Grostyan.)

38. On information and belief, Caterpillar Inc. enters into agreements with local dealers around the country, whereby Caterpillar Inc. permits the local dealers to purchase the Infringing Products at wholesale prices. On further information and belief, Caterpillar has agreements with at least two Delaware dealers, Alban CAT: Felton, with a brick and mortar location at 13074 S. Dupont Highway, Felton, Delaware 19943, and Ransome Cat, with a brick and mortar location at 720 Pulaski Highway, Bear, Delaware 19701. Both dealers' websites advertise the PM620 and PM622 machines as new machines available for purchase.

39. On information and belief, Caterpillar Inc. also distributes the Infringing Products in the United States after importation. The badge on a PM822 observed in the United States indicated that the PM822 was made in Italy and distributed by Caterpillar Inc.

40. Caterpillar Inc. also owns several trademark registrations for trademarks associated with infringing products either through display directly on infringing products or in video and print advertisements for infringing products. For example, Caterpillar Inc. owns U.S Trademark Registration No. 4,804,266 for:

;

U.S. Trademark Registration No. 3,750,812 for:

;

U.S. Trademark Registration No. 2,448,848, for:

CATERPILLAR ;

and U.S. Trademark Registration No. 4,676,117, for:

BUILT FOR IT

On information and belief, the goodwill associated with these trademarks is being used to advertise and sell the Infringing Products at the direction of Caterpillar Inc. For example, a Caterpillar brochure, dubbed a "specalog", advertising the PM620 and PM622 machines bears a copyright to Caterpillar Inc. (*See* Caterpillar publication QEHQ1978-02, PM620 and PM622 Cold Planers (July 2016) [hereinafter Exhibit 20] at 24.)

41. Caterpillar's infringing products include functionality that infringes Wirtgen America's patented technology. For example, each of the Infringing Products includes: (1) a stabilized chassis that infringes the four-way full floating patents; (2) milling drum uncoupling functionality that infringes the driving backwards patent; (3) height-adjustable lifting columns that infringe the path measurement patents; (4) a grade and slope control system that infringes the sensor switching patents; (5) an auxiliary rotor service drive that infringes the auxiliary drive patent; and (6) a pivoting rotor servicing door that infringes the pivoting scraper blade patent.

COUNT 1: INFRINGEMENT OF U.S. PATENT NO. 7,828,309

42. Plaintiff hereby re-alleges and incorporates by reference the allegations of all preceding paragraphs of this Complaint as if fully set forth herein.

43. Caterpillar has and continues to directly or indirectly, and willfully, infringe one or more claims of the '309 patent by importing, making, distributing, using, offering to sell, or selling one or more of the Infringing Products.

44. Caterpillar has engaged in activities which constitute direct infringement of at least claims 1-3, 5-24, and 26-36 of the ’309 patent, in violation of U.S.C. § 271(a).

45. Claim 26 of the ’309 patent is exemplary:

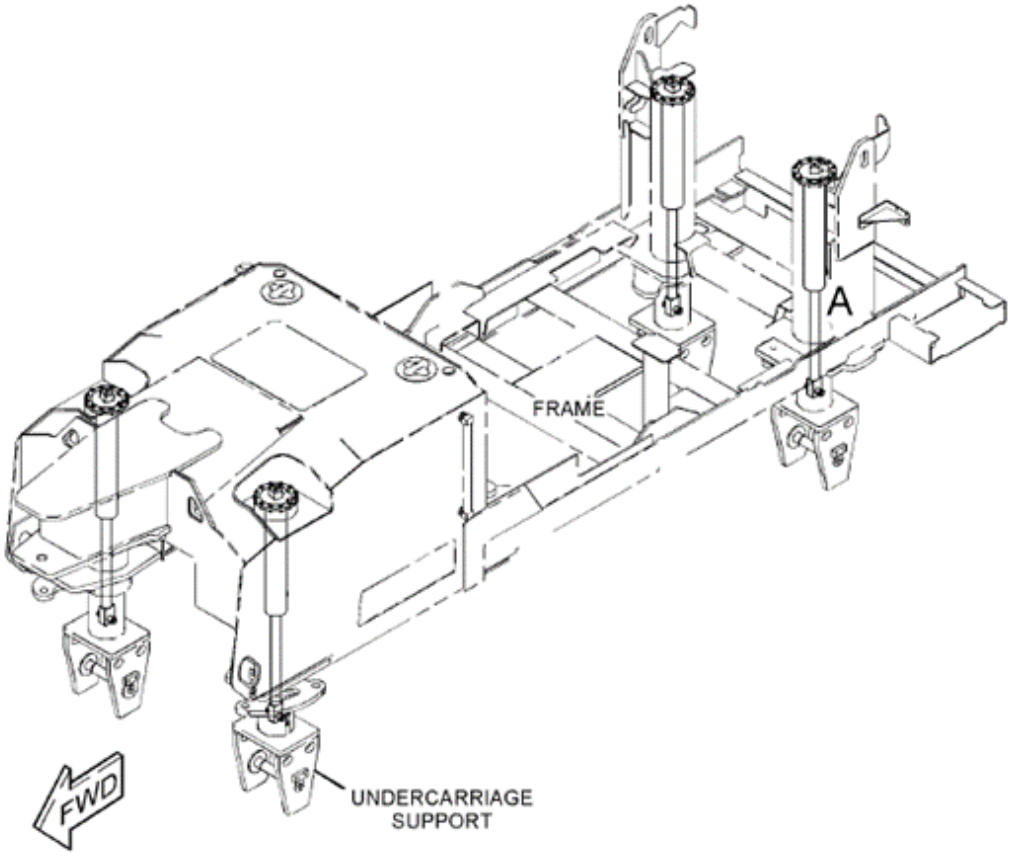
A road-building machine, comprising:
a chassis having a forward direction;
a left front wheel or caterpillar;
a right front wheel or caterpillar;
a left rear wheel or caterpillar;
a right rear wheel or caterpillar;
a first working cylinder rigidly connected to the chassis and connected to the left front wheel or caterpillar for adjusting a height of the left front wheel or caterpillar relative to the chassis;
a second working cylinder rigidly connected to the chassis and connected to the right front wheel or caterpillar for adjusting a height of the right front wheel or caterpillar relative to the chassis;
a third working cylinder rigidly connected to the chassis and connected to the left rear wheel or caterpillar for adjusting a height of the left rear wheel or caterpillar relative to the chassis;
a fourth working cylinder rigidly connected to the chassis and connected to the right rear wheel or caterpillar for adjusting a height of the right rear wheel or caterpillar relative to the chassis;
a rotating working roller or rotor supported from the chassis between the front wheels or caterpillars and the rear wheels or caterpillars and extending transversely to the forward direction;
each of the working cylinders including at least one working chamber filled with a pressure medium; and
coupling lines connecting the working cylinders to one another and providing a positive hydraulic coupling between the working cylinders in such a way that the left front wheel or caterpillar and the right rear wheel or caterpillar are adjusted in height in the same direction and in the opposite direction to the right front wheel or caterpillar and the left rear wheel or caterpillar.

46. The hydraulic arrangement of claim 26 is sometimes referred to as a “four-way full floating” mode of operation. As the ‘309 patent discloses, the hydraulic system of the road milling machine typically allows for other operational modes to provide various functionalities at various times. The “four-way full floating” mode of operation is just one of the operational modes of the machine, and the claimed hydraulic arrangement is the arrangement that is present during the “four-way full floating” mode of operation.

47. As depicted in the Caterpillar brochure, the Infringing Products are road-building machines.

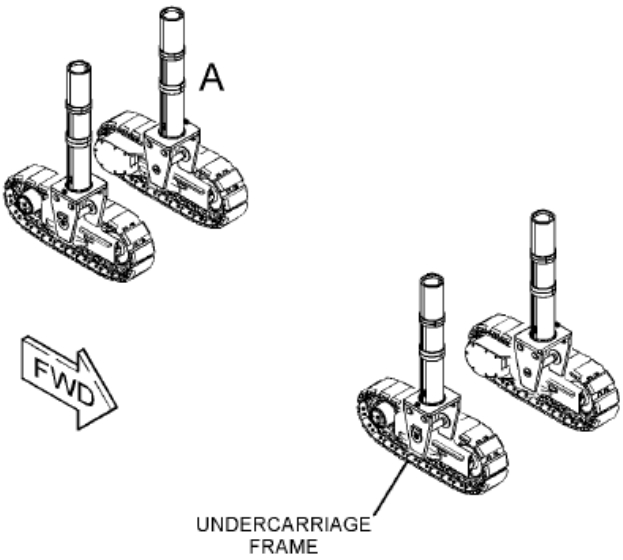
(Exhibit 20 at 22.)

48. The Infringing Products comprise a chassis having a forward direction.



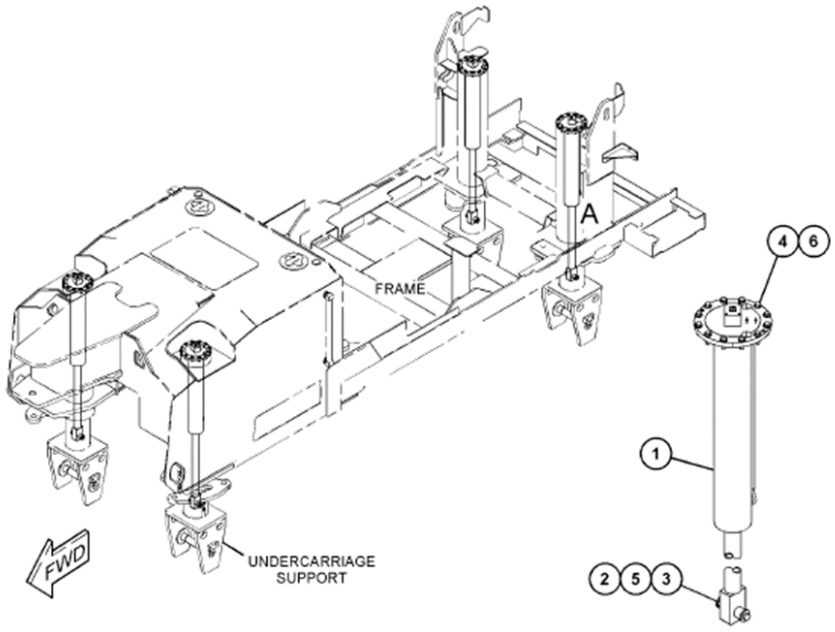
(Caterpillar publication KEBP6265-03, Parts Manual, PM620 Cold Planer (April 2016) [hereinafter Exhibit 21] at 479.)

49. The Infringing Products further comprise a left front caterpillar, right front caterpillar, left rear caterpillar, and right rear caterpillar.



(Ex. 21 at 457.)

50. Four working cylinders are rigidly bolted to the chassis and connected to each of the four caterpillars.



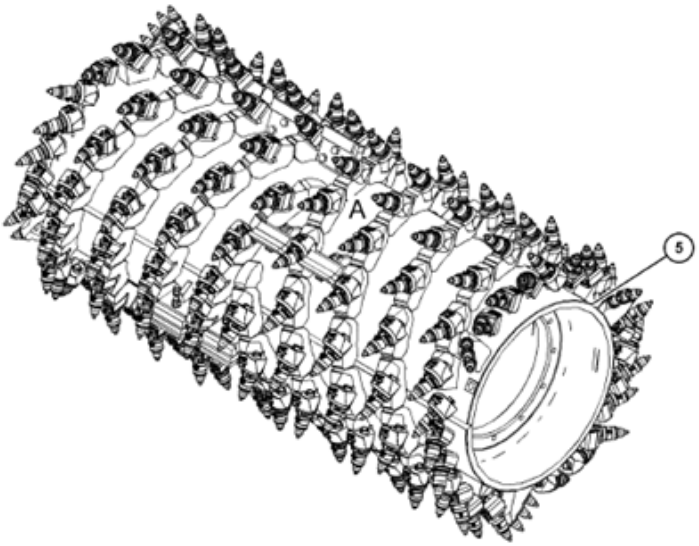
(Ex. 21 at 479 (indicating that the part designated "4", part # 8T-4183, is a bolt).) Each of the working cylinders can be actuated to adjust the height of the attached caterpillar relative to the chassis.

STABLE PLATFORM

– Four leg posts with position sensors independently adjust and provide powered vertical movement to maintain desired height

(Ex. 20 at 7.) The Operation and Maintenance Manual for the PM620 and PM622 (KEBU7584-01, February 2016) (attached hereto as Exhibit 22) at pages 48-49, further discusses the adjustability of the height of the legs.

51. The Infringing Products include a rotor.



(Ex. 21 at 638.) The rotor is supported from the chassis between the front caterpillars and the rear caterpillars and extends transversely to the forward direction.

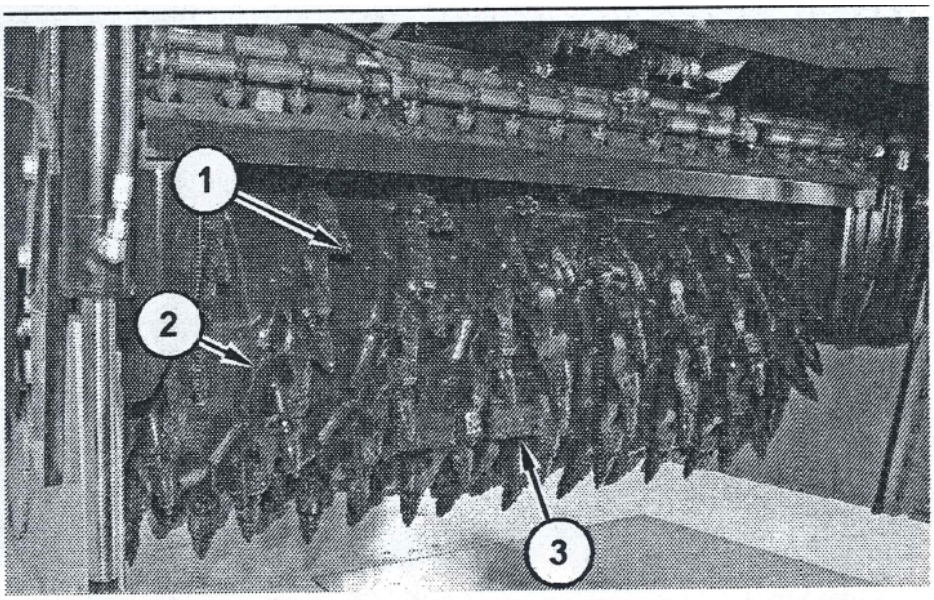


Illustration 64 g06073159

Rotor Drum

(1) Cutter bits
(2) Flighting
(3) Paddles

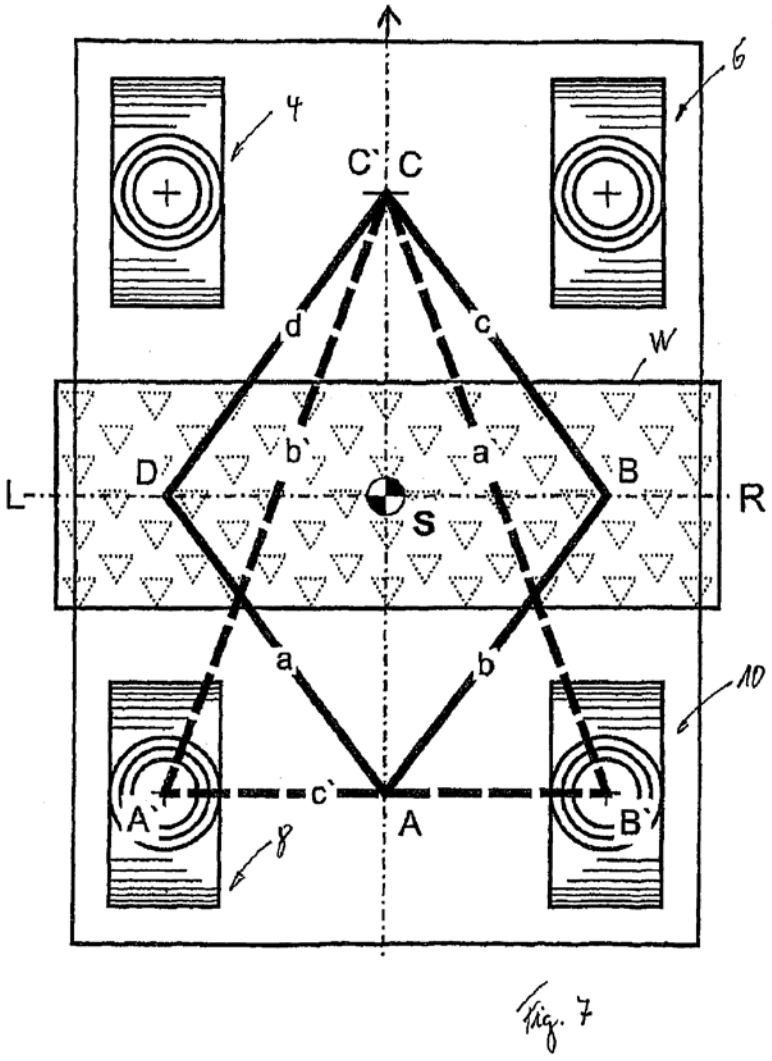
The rotor is the work tool of the machine. The rotor is located in the center of the machine, between the front and rear tracks.

(Caterpillar Publication UENR6294, Systems Operation Testing and Adjusting, PE622, PM620 and PM622 Cold Planer Machine System (October 2016) [hereinafter Exhibit 23] at 65.)

52. Figure 7 of the '309 patent compares the stability of the "four-way full floating" arrangement to the "conventional" hydraulic arrangement previously used in road milling machines. (*See* Ex. 2.) Conventional machines have a floating axle at the front and a rigid axle at the rear or alternatively a floating axle at the rear and a rigid axle at the front. This "conventional" arrangement is also sometimes referred to as a "classical" hydraulic coupling arrangement for road milling machines. As illustrated in Figure 7 of the '309 patent, a milling

machine using the "conventional" or "classical" arrangement remains stable only if the center of gravity lies within the stability triangle A', B', C'. (*See* Ex. 2.)

53. In contrast, milling machines equipped with a four-way full floating mode of operation as disclosed in the '309 patent remain stable when the center of gravity lies with the stability diamond A, B, C, D. Figure 7 of the '309 patent is reproduced below for reference:



(Ex. 2.)

54. The Infringing Products can automatically switch between operating in a "conventional" or "classical" mode and a "four-way full floating" mode. Caterpillar calls its "four-way full floating" mode "ride control."

When enabled, the ride control system is automatically activated when the following conditions are met:

- "Automatic" grade and slope control of the front legs is disabled.
- Machine speed is greater than 0.2 kph (0.12 mph) for 2 seconds.
- A RAISE or LOWER command is not present.

(Ex. 23 at 48.) For frame of reference, the average walking speed of a human is 3.1 mph, more than twenty-five times faster than that required for automatic activation of ride control in the Infringing Products.

55. The Infringing Products include a hydraulic system containing a pressure medium such as oil which fills at least one working chamber of each working cylinder.

Rear leg lower solenoid (2) controls directional oil flow for both the rear leg cylinders. When this solenoid is energized, supply oil is directed to the rod end of the cylinder and a counterbalance valve. Return oil from the head end of the cylinders is directed to the return line.

Rear leg raise solenoid (5) controls directional oil flow for both the rear leg cylinders. When this solenoid is energized, supply oil is directed to the head end of the cylinder and opens pilot check valve (4). Return oil from the rod end of the cylinder is directed to the return line.

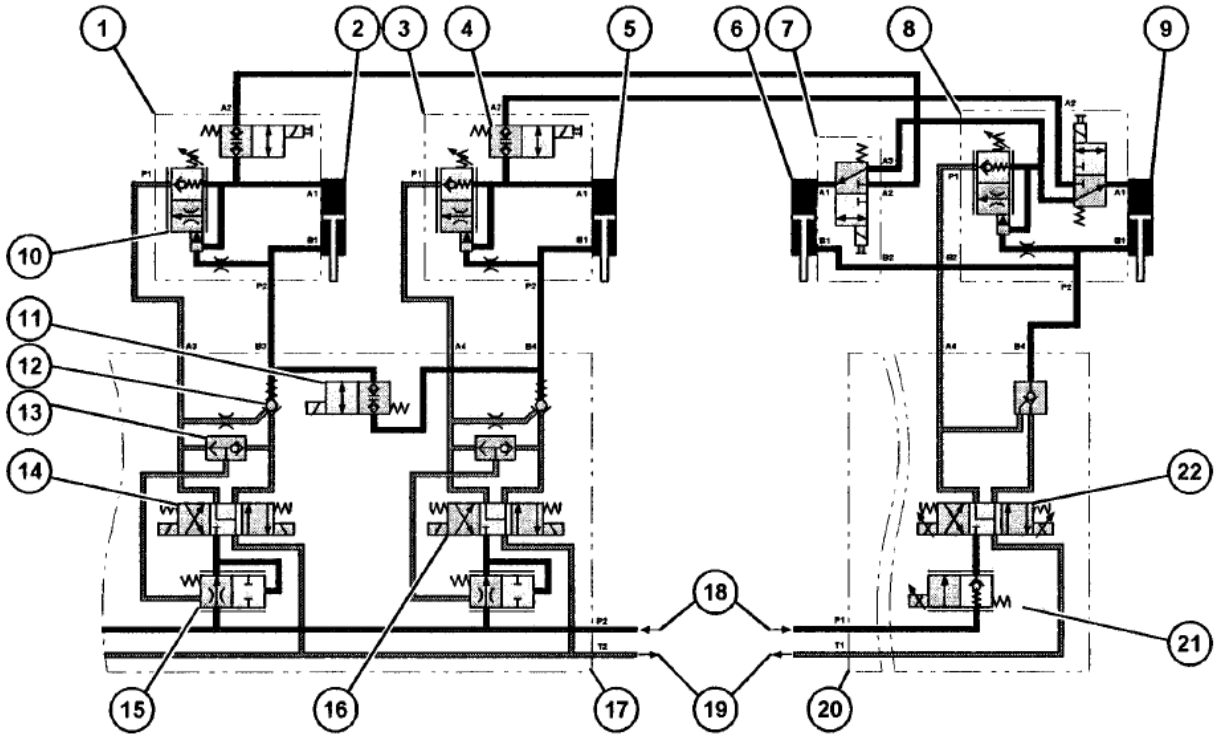
(Ex. 23 at 18 (explaining that hydraulic oil is supplied to rod end and head end chambers of each rear leg cylinder).)

Right front leg lower solenoid (3) and left front leg lower solenoid (4) operate in the same manner. These solenoids control directional oil flow to the front leg cylinders. When either solenoid is energized, supply oil is correspondingly directed to the rod end of the cylinder and a counterbalance valve. Return oil from the head end of the cylinder is directed to the return line.

Right front leg raise solenoid (7) and left front leg raise solenoid (8) operate in the same manner. These solenoids control directional oil flow to the front leg cylinders. When either solenoid is energized, supply oil is correspondingly directed to the head end of the cylinder and opens respective pilot check valve (5). Return oil from the rod end of the cylinder is directed to the return line.

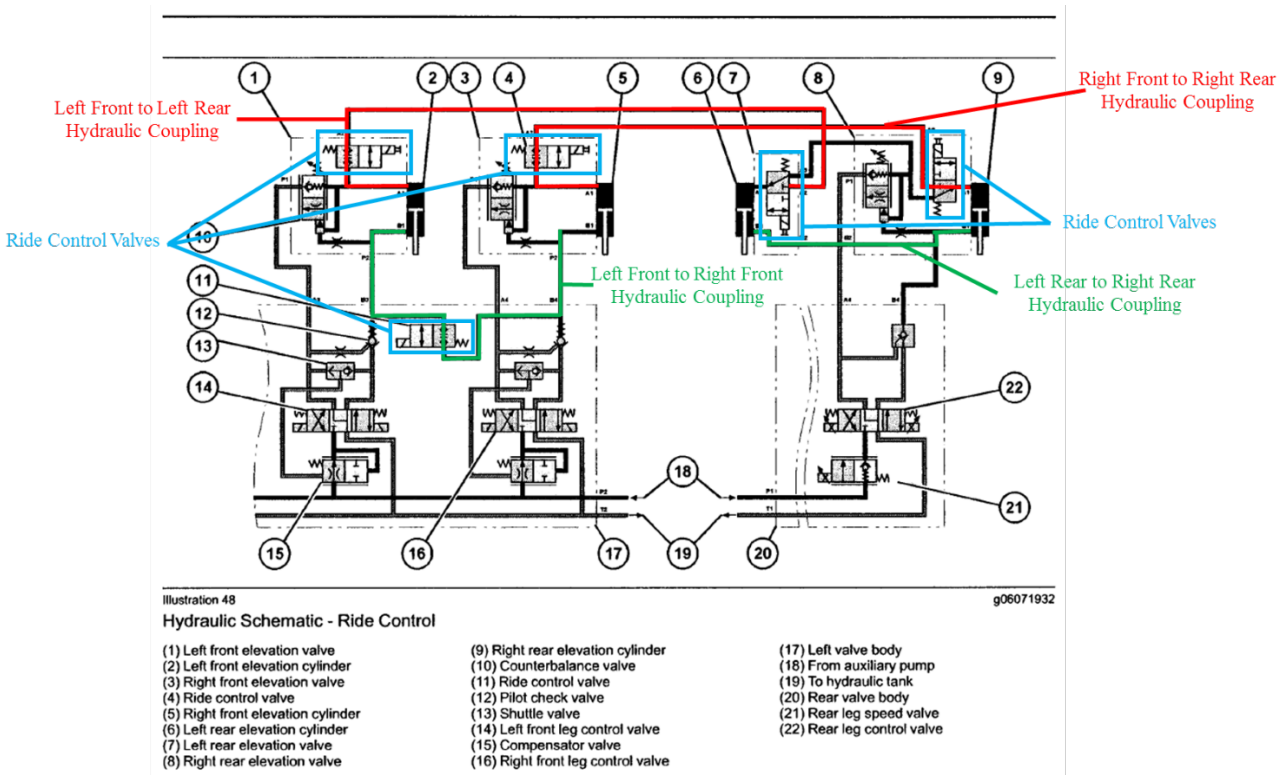
(Ex. 23 at 20-21 (explaining that hydraulic oil is supplied to rod end and head end chambers of each front leg cylinder).)

56. The schematic below shows the hydraulic arrangement of the Infringing Products when operating in the ride control mode. The working cylinders (designated "2," "5," "6," and "9") are double-acting working cylinders (i.e., differential cylinders) with a first working chamber at the head end and a second working chamber at the rod end. Coupling lines are connected to both the head end and rod end of each cylinder. Those coupling lines further connect the working cylinders to one another.

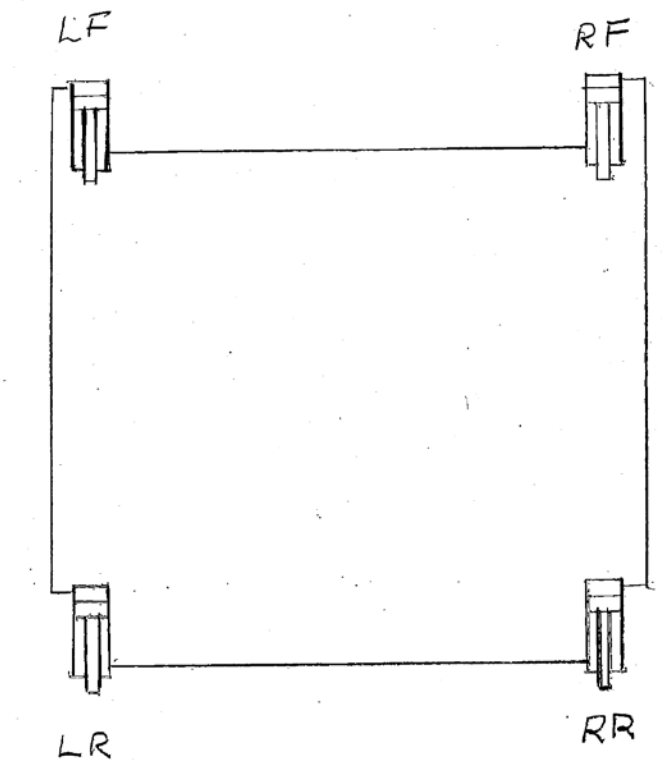


(Ex. 23 at 48.)

57. When in ride control mode, the working cylinders are positively coupled to one another; "the leg cylinders are connected in a series circuit." (Ex. 23 at 48.) In the Infringing Products, this is accomplished using five ride control valves. (*See* Ex. 23 at 48.) "When the ride control feature is activated, the five ride control valves (4) and (11) open simultaneously." (Ex. 23 at 48.) As a result, the first working chamber of the left front cylinder is coupled to the first working chamber of the left rear cylinder, the first working chamber of right front cylinder is coupled to the first working chamber of the right rear cylinder, the second working chamber of the left front cylinder is coupled to the second working chamber of the right front cylinder, and the second working chamber of the left rear cylinder is coupled to the second working chamber of the right rear cylinder.



(Ex. 23 at 48.) "In this condition, the pressure in the four leg cylinders is equalized." (Ex. 20 at 48.) "Each leg is tied together hydraulically to allow flow sharing and automatic adjustment of the legs when traveling over obstacles." (Caterpillar Publication UENR6406, Systems Operation Troubleshooting, PE622, PM620 and PM622 Cold Planers Electronic System (March 2016) [hereinafter Exhibit 24] at 8.) In effect, actuation of any actuating member causes the left front and right rear caterpillars to be adjusted in height in the same direction and in the opposite direction to the right front and left rear caterpillars. In simplified form, when in ride control mode the four cylinders of the Infringing Products are connected as shown below.



58. Accordingly, all the claim limitations of claim 26 of the ’309 patent are met by the Infringing Products.

59. Caterpillar has or has been, at all times relevant to this action, fully aware of and has or had actual knowledge of the ’309 patent.

60. Caterpillar has made profits from its acts of patent infringement and Plaintiff has suffered damages for which it is entitled to relief under 35 U.S.C. § 284.

61. Caterpillar’s acts are or were deliberate and willful, and will continue unless enjoined by this Court.

62. As a result of the deliberate and willful nature of Caterpillar’s acts, such damages should be increased to the maximum amount allowed by law, including an award of attorneys’ fees.

COUNT 2: INFRINGEMENT OF U.S. PATENT NO. 8,118,316

63. Plaintiff hereby re-alleges and incorporates by reference the allegations of all preceding paragraphs of this Complaint as if fully set forth herein.

64. Caterpillar is or has directly or indirectly, and willfully, infringed one or more claims of the ’316 patent by importing, making, distributing, using, offering to sell, or selling one or more of the Infringing Products.

65. Upon information and belief, Caterpillar’s customers that have purchased the Infringing Products have and continue to engage in activities which constitute direct infringement of at least claims 1-16, 19, and 20 of the ’316 patent, in violation of 35 U.S.C. § 271(a). For example, a PM622 was observed next to a road milling operation near Exit 6 of Interstate 110 outside El Paso, Texas.

Employees of Plote Construction have used a PM622 to perform road milling near the Roselle Road exit on Interstate 90 near Schaumburg, Illinois.

A PM822 was also observed operating in Louisiana.

66. Caterpillar has also posted at least two customer testimonial videos on YouTube, showing customers operating the Infringing Products. These customers include White Oak Asphalt of Fredericksburg, Virginia (https://www.youtube.com/watch?v=M2sinPf9laA) and Tri-City Blacktop of Bettendorf, Iowa (https://www.youtube.com/watch?v=vsgJpYQpv-c) .

67. Caterpillar has and is inducing infringement of the ’316 patent by actively and knowingly inducing purchasers of the Infringing Products to use the Infringing Products in a way

that infringes claims 1-16, 19, and 20 of the '316 patent, in violation of 35 U.S.C. § 271(b). Specifically, as described above, when operated at speeds above 0.12 mph, the Infringing Products automatically engage positive hydraulic coupling of the cylinders, inherently practicing at least claims 1-16, 19, and 20 of the '316 patent. Furthermore, Caterpillar literature provides guidelines for reducing vibration levels on earthmoving equipment instructing that to "[m]inimize vibrations for a long work cycle or a long travel distance" operators should "[u]se the ride control system." (Ex. 22 at 32.)

68. Claim 1 of the '316 patent is exemplary:

A method of operating a road-building machine, comprising:
(a) providing a road-building machine including:
a chassis having a forward direction;
a left front ground engaging support:
a right front ground engaging support;
a left rear ground engaging support;
a right rear ground engaging support;
a first working cylinder rigidly connected to the chassis and connected to the left front ground engaging support for adjusting a height of the left front ground engaging support relative to the chassis;
a second working cylinder rigidly connected to the chassis and connected to the right front ground engaging support for adjusting a height of the right front ground engaging support relative to the chassis;
a third working cylinder rigidly connected to the chassis and connected to the left rear ground engaging support for adjusting a height of the left rear ground engaging support relative to the chassis;
a second working cylinder rigidly connected to the chassis and connected to the right rear ground engaging support for adjusting a height of the right rear ground engaging support relative to the chassis;
a rotating working drum supported from the chassis between the front ground engaging supports and the rear ground engaging supports and extending transversely in the forward direction;
each of the working cylinders including at least one working chamber filled with a pressure medium; and
coupling lines connecting the working cylinders to one another and providing a positive hydraulic coupling between the working cylinders;
(b) adjusting the height of the left front and right rear ground engaging supports in a first direction; and
(c) adjusting the height of the right front and left rear ground engaging supports in a second direction opposite the first direction.

69. For the reasons discussed above in relation to claims 26 of the '309 patent, all the limitations of claim 1 of the '871 patent are met by the Infringing Products.

70. Exemplary dependent claims include claims 10 and 14.

71. Claim 10 recites as follows:

> The method of claim 1, further comprising:
> temporarily cancelling the positive hydraulic coupling between the working cylinders; and
> subsequently restoring the positive hydraulic coupling.

72. Claim 14 recites as follows:

> The method of claim 10, further comprising:
> during the temporarily cancelling step, lowering all of the ground engaging supports by the same amount.

73. The ride control system "must be turned ON and OFF depending on what machine functions are active." (Ex. 24 at 8.) For example, the Operation and Maintenance Manual for the PM620 and PM622 describes an "All Legs Lower" feature: "[w]hen the button is pressed, all leg heights are first equalized then all four legs retract at the same rate." (Ex. 22 at 49.) Due to the coupling arrangement described above, the only way to accomplish retraction of all four legs at the same rate is to cancel the positive hydraulic coupling between the working cylinders. Accordingly, the ride control system is deactivated when, for example, a RAISE or LOWER command is present and reactivated when absent. (*See* Ex. 23 at 48.)

74. Accordingly, all the claim limitations of claims 10 and 14 are met by the automatic deactivation and reactivation of the ride control system of the Infringing Products.

75. Caterpillar is or has been, at all times relevant to this action, fully aware of and has or had actual knowledge of the '316 patent.

76. Caterpillar has made profits from its acts of patent infringement, and Plaintiff has suffered damages for which it is entitled to relief under 35 U.S.C. § 284.

77. Caterpillar's acts are or were deliberate and willful, and will continue unless enjoined by this Court.

78. As a result of the deliberate and willful nature of Caterpillar's acts, such damages should be increased to the maximum amount allowed by law, including an award of attorneys' fees.

COUNT 3: INFRINGEMENT OF U.S. PATENT NO. 7,530,641

79. Plaintiff hereby re-alleges and incorporates by reference the allegations of all preceding paragraphs of this Complaint as if fully set forth herein.

80. Caterpillar has and continues to directly or indirectly, and willfully, infringe one or more claims of the '641 patent by importing, making, distributing, using, offering to sell, or selling one or more of the Infringing Products.

81. Caterpillar has engaged in activities which constitute direct infringement of at least claims 1, 2, 4, and 6-8 of the '641 patent, in violation of U.S.C. § 271(a).

82. Upon information and belief, Caterpillar's customers that have purchased the Infringing Products have and continue to engage in activities which constitute direct infringement of at least claims 11, 12, and 15-17 of the '641 patent, in violation of 35 U.S.C. § 271(a).

83. Caterpillar has and is inducing infringement of the '641 patent by actively and knowingly inducing purchasers of the Infringing Products to use the Infringing Products in a way that infringes at least claims 11, 12, and 15-17 claims of the '641 patent, in violation of 35 U.S.C. § 271(b). The functionality described below is a safety feature inherent to operation of the Infringing Products. Thus, operation of the Infringing Products inherently infringes at least claims 11, 12, and 15-17 of the '641 patent.

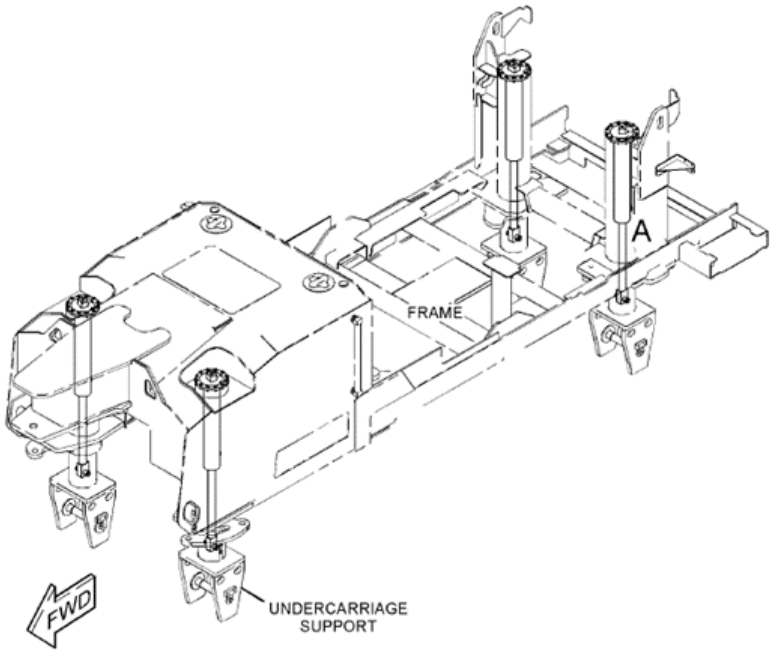
84. Claim 1 of the ’641 patent is exemplary:

Automotive construction machine (1) for working ground surfaces (2),
with a machine frame (5);
with a drive engine (6) for driving traveling devices (8) and for driving working devices, and
with a milling drum (12) for milling the ground surfaces (2), which is capable of being raised and is driven by and capable of being uncoupled from the drive engine (6),
where the milling drum (12) is capable of being moved into a raised position when it is not in milling mode,
characterized in that,
the milling drum (12) remains coupled with the drive engine (6) when in raised position and with a direction of travel in which the rotating direction of the milling drum (12) corresponds to the rotating direction of the traveling devices (8), and
a monitoring device (14) monitors a distance between the milling drum (12) and the ground surface (2) and uncouples the raised milling drum (12) from the drive engine (6) and/or uncouples the traveling devices (8) from the drive engine (6) and/or raises the machine frame (4) and/or generates an alarm signal when the monitoring device (14) detects a deviation that falls below a pre-determined distance.

85. The Infringing Products are automotive construction machines for working ground surfaces (i.e., milling or cold planning).

(Ex. 20 at 22.)

86. The Infringing Products have a machine frame.



(Ex. 21 at 479.)

87. Infringing Products have a drive engine for driving traveling devices and for driving working device. They include a C18 ACERT engine which drives the machines' powertrain, including traveling devices such as the "propel system" that includes two propel pumps each of which "drives the propel motors for two crawler tracks". (Ex. 20 at 6.)

C18 ACERT ENGINE

- Meets U.S. EPA Tier 4 Final and EU Stage IV emission standards
- Provides a gross power of 470 kW (630 hp)
- Automatic idle control function and multiple rotor speeds optimizes output to the demand on the engine, keeping operation smooth and efficient
- High capacity cooling system keeps engine at ideal temperature for optimal fuel efficiency and lower emissions
- Proven core engine design ensures reliability and quiet operation
- Engine is iso-mounted to reduce noise and vibration

PROPEL SYSTEM

- Robust propel system features two propel pumps and two propel circuits, diagonally opposed; each circuit drives the propel motors for two crawler tracks
- Cross-flow traction control supplies dedicated hydraulic flow diagonally across machine to the tracks that grip
- Automatic Load Control senses load changes on the rotor system load and adjusts propel speed to prevent stalls and optimize production

(Ex. 20 at 6.)

88. The engine also drives a milling drum through a "rotor drive system." (Ex. 20 at 10-11.)

(Ex. 20 at 11 (depicting the working drum under the heading "Cutting System").) The engine also drives collecting and loading conveyors, among other working devices.

COLLECTING CONVEYOR

- A wide opening and seamless 850 mm (33.5 in) wide belt efficiently clears rotor chamber
- Reversible for easy clean out
- Optional grease tensioner provides easy adjustment of belt alignment and tension.

LOADING CONVEYOR

- Aluminum covers and vinyl side panels reduce spillage and help control dust
- Seamless 850 mm (33.5 in) wide belt provides heavy duty, high speed discharge
- Variable belt speed optimizes speed to material type and production rate
- Reversible for easy clean out
- "Boost" feature provides a temporary surge in belt speed to help precisely place material
- Loading conveyor folds to reduce length for transport
- Loading conveyor swings 60 degrees from center position to the left or right

(Ex. 20 at 14-15.)

When the engine is operating, oil from the charge pump flows through the charge filter and to the charge manifold. The charge manifold splits the charge flow between the following hydraulic systems on the machine:

- Propel system
- Fan system
- Conveyor system

(Ex. 23 at 88.)

89. As noted above, the Infringing Products have a milling drum (also referred to as a rotor). The milling drum is located behind the side plate.

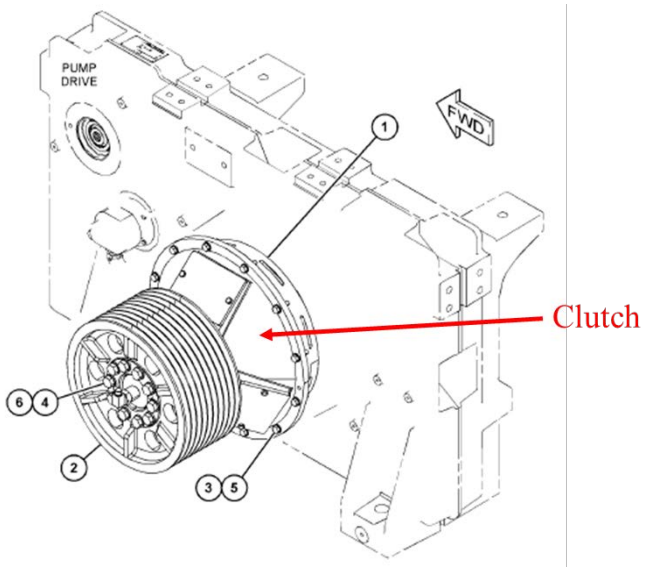
(Ex. 20 at 7).

90. The milling drum is capable of being raised. As discussed above in relation to the '309 and '316 patents, the caterpillars are adjustable in height in relation to the machine frame. Thus, by increasing the height of the machine frame relative to the caterpillars, the milling drum is raised.

> Leg position sensors (9), (10), (11), and (12) allow machine ECM (2) to monitor the vertical position of the machine to control the rotor cut depth. Five preset leg positions are associated with the leg elevation system as follows:

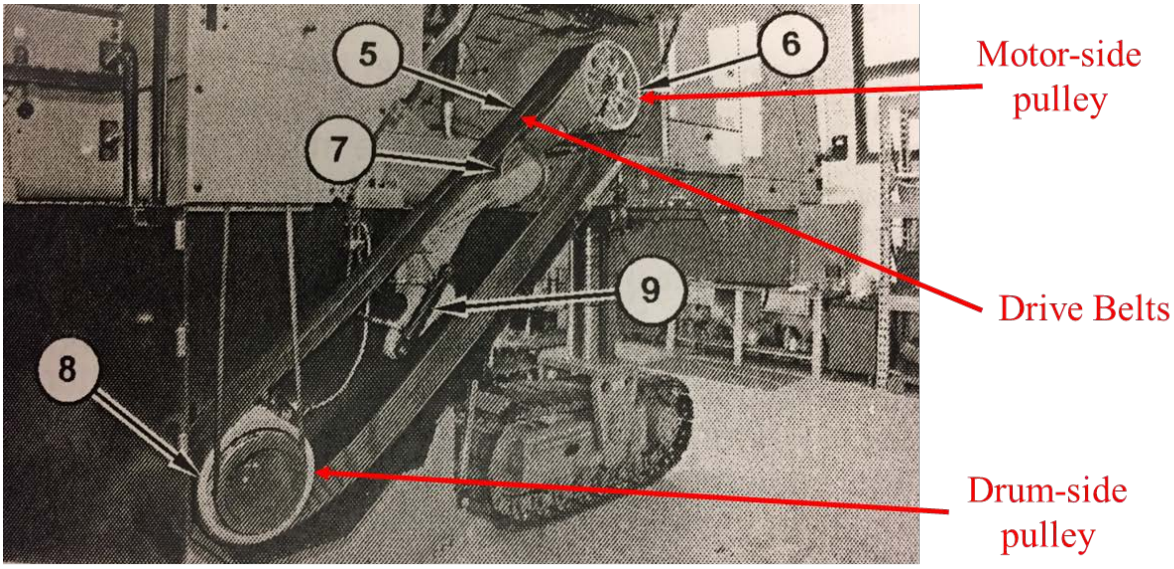
(Ex. 23 at 28.)

91. The work motor is operatively coupled to a heavy-duty dry clutch (Ex. 17 at 11) that engages a belt drive, which in turn drives the working drum.

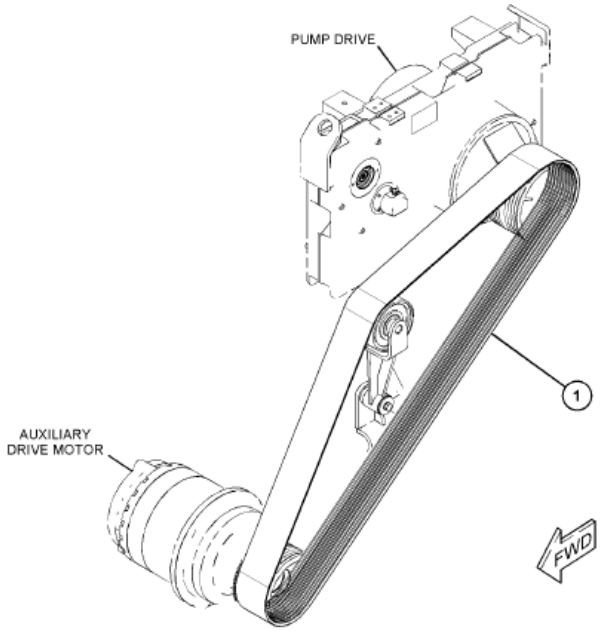


(Ex. 21 at 394 (the clutch, part # 374-1350, is designated as "1").)

92. The belt dive includes motor-side pulley, a drum-side pulley, and multiple drive belts connecting the motor-side pulley to the drum-side pulley.



(Ex. 23 at 66.)



(Ex. 21 at 391.) The clutch can uncouple the traction drive from the drive engine, thereby uncoupling the milling drum from the drive engine. For example, the Operator Console has a button that allows the operator to turn the rotor drive on and off. (Ex. 22 at 57.)

The machine is equipped with a large rotor drum with numerous carbide cutting bits. Diamond cutting bits are available as an option. The rotor is mechanically driven by the engine through a dry clutch, twin belts, and planetary gear unit.

The hydraulically actuated clutch engages and disengages the rotor drive. The twin belt drive system is equipped with a hydraulic tensioner to maintain proper rotor drive tension during operation. Oil flow to operate the rotor clutch actuator and the belt tensioning cylinder is provided by the auxiliary hydraulic pump.

(Ex. 23 at 64.)

93. As contemplated by the ’641 patent, a machine is in milling mode when the milling drum is working the ground surface. The milling drum preferably mills the ground in up-milling mode. In other words, when in milling mode, the drum rotates in the opposite direction of travel, as demonstrated by Figure 1 of the ’641 patent.

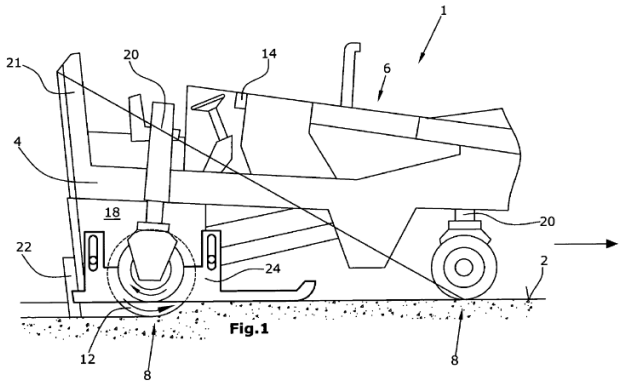


Fig.1

(*See* Ex. 4.) The milling drum can be raised when it is not in milling mode.

Leg position sensors (9), (10), (11), and (12) allow machine ECM (2) to monitor the vertical position of the machine to control the rotor cut depth. Five preset leg positions are associated with the leg elevation system as follows:

(Ex. 23 at 28.) Although not working the ground surface, the milling drum remains coupled to the drive engine and continues to rotate at milling mode speed.

The transmission ECM controls the rotor operation. To engage the rotor, several parameters must be met. Before engagement begins, the propel system must be in neutral, the rotor door must be closed, and the engine speed must be below 850 rpm. Once engaged, three speeds are available for rotor operation.

(Ex. 23 at 64.) With the milling drum raised, the PM620 can be driven in reverse, at which point the rotation of the milling drum in up-milling mode corresponds to the rotating direction of the caterpillar tracks. This operating mode corresponds to Figure 2 of the '641 patent. (*See* Ex. 4.)

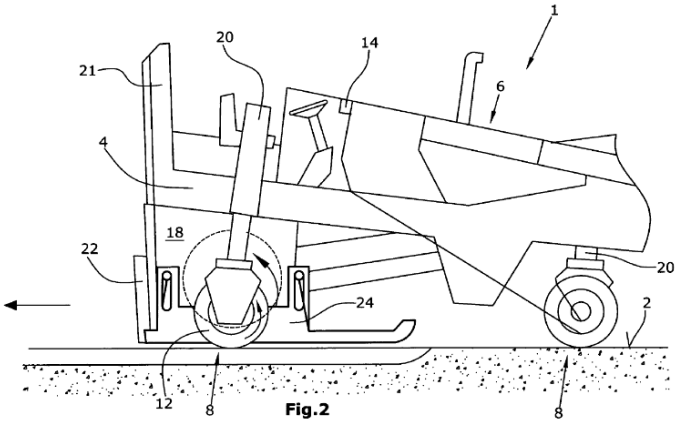


Fig.2

94. The Infringing Products monitor a distance between the milling drum and the ground surface via one or more of the side plate position and the scraper ("moldboard") position.

Side plate position sensor (16) is installed in each side plate cylinder. The cylinders are at the front and rear of the side plates. The left front position sensor is shown in Illustration 14 .

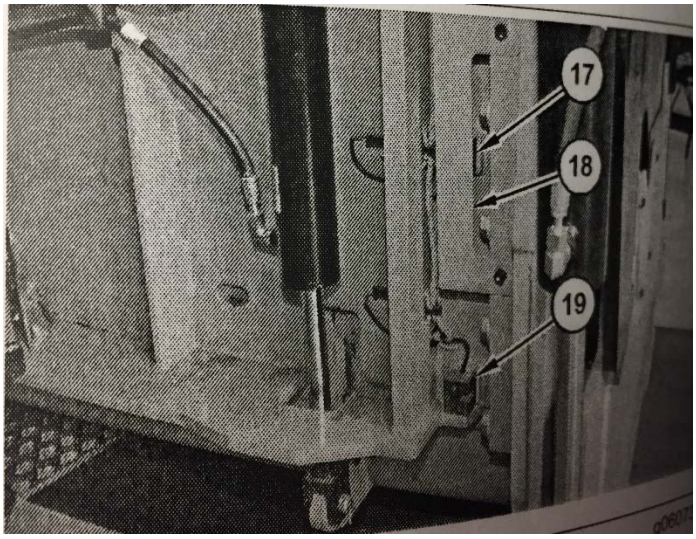
Side plate position sensor (16) is a linear sensor that sends a pulse-width modulated (PWM) signal directly to the transmission ECM. These sensors transmit the vertical position of the side plates. The signal is used to set a reference level and to determine the rotor cut depth for each side of the machine.

The moldboard position is determined by switches mounted to the rotor service door and a plate mounted to the moldboard. These components are accessed at the rear of the cutter chamber.

Moldboard raised switch (17) and moldboard lowered switch (19) are magnetic switches. These normally open switches are monitored by the steering ECM. As trigger plate (18) passes over a switch, the switch closes and changes state in the ECM logic. The combined state of the switches resolves the moldboard location. The position of the moldboard is determined as follows:

- When the moldboard is fully lowered, moldboard lowered switch (19) is closed. In this position, the state of moldboard raised switch (17) is disregarded.
- When the moldboard is in the intermediate travel range, moldboard lowered switch (19) is open and moldboard raised switch (17) is closed.
- When the moldboard is raised to the upper operating limit, both moldboard lowered switch (19) and moldboard raised switch (17) are open.

(Ex. 23 at 14-15.) The photograph below also shows the arrangement of the switches (designated "17" and "19") and trigger plate (designated "18").



(Ex. 23 at 14.)

Moldboard raised switch (17) and moldboard lowered switch (19) are magnetic switches. These normally open switches are monitored by the steering ECM. As trigger plate (18) passes over a switch, the switch closes and changes state in the ECM logic. The combined state of the switches resolves the moldboard location. The position of the moldboard is

(Ex. 23 at 15.)

95. The combination of the moldboard, proximity switches, and trigger plate constitute a monitoring device that monitors a distance between the milling drum and the ground surface. When driving the PM620 in reverse with the milling drum raised and rotating in the upmilling direction, if the lower part of the moldboard is pushed up by engagement with the ground surface, the proximity switch detects movement of the trigger plate. In this way, the moldboard senses the ground surface, and, in combination with the proximity switches, monitors the distance between the raised milling drum and the ground surface.

96. The automatic rotor disengagement feature monitors the scraper ("moldboard") and side plate position to determine when to disengage the rotor. Upon sensing engagement of the moldboard with the ground surface, the Infringing Products disengage the clutch, effectively uncoupling the raised milling drum from the drive engine.

An automatic rotor disengagement feature detects a condition where the rotor could come in contact with a surface while the machine is traveling in reverse. If this rotor exposure condition is detected, the rotor drive is disengaged. For this feature, side plate sensors (9), (10), (11) and (12), and the moldboard position are monitored. Steering ECM (1) monitors the left side plate sensors and the moldboard position. Transmission ECM (2) monitors the right side plate sensors.

(Ex. 23 at 74.) The rotor disengagement occurs via disengagement of the clutch.

Rotor Disengagement

A rotor disengagement command is initiated by pressing and releasing either rotor control switch. When this command is received, transmission ECM (2) immediately de-energizes rotor clutch solenoid (13). This action disengages the rotor clutch.

(Ex. 23 at 74.) This occurs when (1) the Infringing Products are operating in reverse, (2) the rotor drive status is "on," and (3) "[t]he moldboard status changes to 'Not Lowered.'" (*See* Ex. 23 at 74.)

97. The automatic rotor disengagement feature also generates an alarm signal when the monitoring device detects a deviation that falls below a pre-determined distance.

> The side plate raised threshold is based on the duty cycle of the position sensors. If the duty cycle of either left side plate sensor (9) and (10) is less than 78.9 percent, an event is detected. If the duty cycle of either right side plate sensor (11) and (12) is less than 81.4 percent, an event is detected.
>
> When an event is detected, a Level 2 warning is activated for 5 seconds and is logged. The rotor drive status changes to "Disengaging" and the normal disengagement sequence is initiated. When the rotor disengagement feature is activated, the machine is allowed to continue to travel in reverse.

(Ex. 23 at 74.)

98. Accordingly, all the claim limitations of claim 1 of the '641 patent are met by the Infringing Products.

99. Exemplary dependent claims include claims 4 and 6-8.

100. Claim 4 recites as follows:

> Construction machine (1) in accordance with claim 1, characterized in that the monitoring device (14) monitors, with at least one sensor, a pre-determined distance between the raised milling drum (12) and the ground surface (2).

101. Claim 6 recites as follows:

> Construction machine (1) in accordance with claim 1, characterized in that the milling drum (12) is raised by a pre-determined amount that is larger than a minimum distance between the milling drum (12) and the ground surface (2), and in that a sensing device measuring towards the ground surface (2) shows a lower limit position that corresponds to a pre-determined distance or to a minimum distance to be maintained between the milling drum (12) and ground surface.

102. Claim 7 recites as follows:

> Construction machine (1) in accordance with claim 1, characterized in that at least one sensing device capable of being lowered relative to the raised milling drum (12) is arranged at the milling drum (12) in such a manner that the sensing device projects vis-à-vis the milling drum (12) towards the ground surface (2) by a pre-determined distance and in that the monitoring device (14), in the raised position of the milling drum (12) and the simultaneously lowered position of the sensing device, uncouples at least the milling drum (12) from the drum drive (10) when the monitoring device (14) detects a contact of the at least one sensing device with the ground surface (2) or that the at least one sensing device is raised by the ground surface (2).

103. Claim 8 recites as follows:

> Construction machine (1) in accordance with claim 6, characterized in that the sensing device consists of a scraper blade (22) that is arranged behind the milling drum (12) when seen in the direction of travel.

104. The operator may raise or lower the moldboard by pressing a button, thereby setting a pre-determined distance between the raised milling drum and the ground surface. (Ex. 19 at 49-50.)

105. Thus, taken together with allegations as to claim 1, the Infringing Products meet all the limitations of claims 4, 6, 7, and 8.

106. Caterpillar has or has been, at all times relevant to this action, fully aware of and has or had actual knowledge of the ’641 patent.

107. Caterpillar has made profits from its acts of patent infringement, and Plaintiff has suffered damages for which it is entitled to relief under 35 U.S.C. § 284.

108. Caterpillar’s acts are or were deliberate and willful, and will continue unless enjoined by this Court.

109. As a result of the deliberate and willful nature of Caterpillar’s acts, such damages should be increased to the maximum amount allowed by law, including an award of attorneys’ fees.

COUNT 4: INFRINGEMENT OF U.S. PATENT NO. 8,113,592

110. Plaintiff hereby re-alleges and incorporates by reference the allegations of all preceding paragraphs of this Complaint as if fully set forth herein.

111. Caterpillar has and continues to directly or indirectly, and willfully, infringe one or more claims of the ’592 patent by importing, making, distributing, using, offering to sell, or selling one or more of the Infringing Products.

112. Caterpillar has engaged in activities which constitute direct infringement of at least claims 1, 2, 5, 13-15, 18 and 20 of the ’592 patent, in violation of U.S.C. § 271(a).

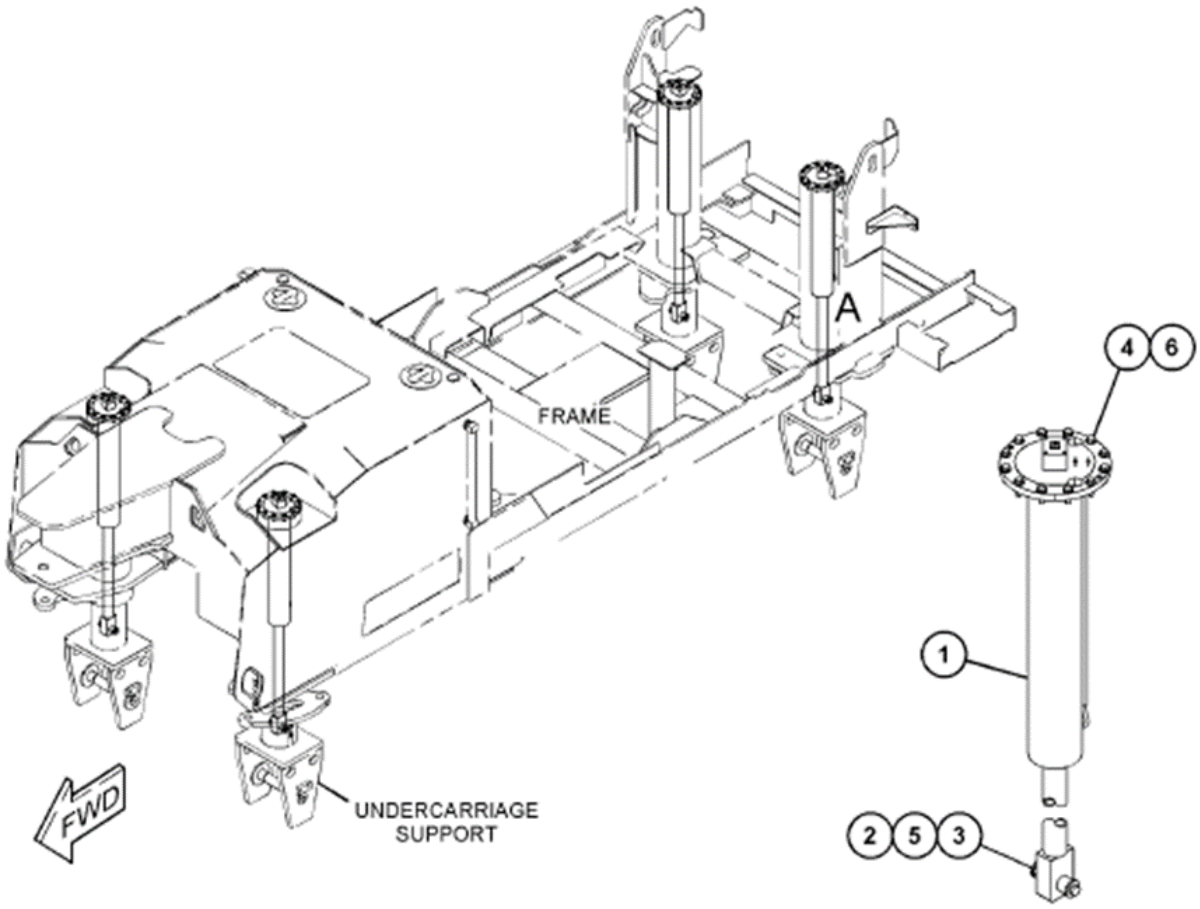
113. Claim 1 of the ’592 is exemplary:

A road construction machine, comprising:
a machine frame;
a working drum supported from the machine frame for working a ground surface or traffic surface;
a plurality of ground engaging supports for supporting the construction machine on the ground surface or traffic surface;
a plurality of lifting columns, each one of the lifting columns being connected between the machine frame and one of the ground engaging supports, each one of the lifting columns including two telescoping hollow cylinders and at least one piston-cylinder unit located within the telescoping hollow cylinders for adjusting a height of the lifting column so that each one of the lifting columns is individually adjustable in height relative to the machine frame, each lifting column having a lifting position corresponding to a position of one of the two telescoping hollow cylinders relative to the other of the two telescoping hollow cylinders;
a plurality of lifting position measuring devices, each lifting position measuring device being coupled with elements of one of the lifting columns, which elements are capable of being displaced relative to one another in accordance with the lifting position of the lifting column in such a manner that a path signal pertaining to the lifting position of the lifting column is continuously detectable by the measuring device; and
a controller operably connected to the lifting position measuring devices to receive the path signals from the lifting position measuring devices, the controller being operable to regulate the lifting positions of the lifting columns in response to the path signals detected by the lifting position measuring devices.

114. As discussed previously, the Infringing Products are road construction machines, with a machine frame, a working drum (milling drum) supported from the machine frame for

working ground surfaces (i.e., milling or cold planning), and a plurality of ground engaging supports (caterpillars) for supporting the construction machine on the ground surface or traffic surface.

115. The Infringing Products have a plurality of lifting columns, each connected between the machine frame and one of the ground engaging supports.



(Ex. 21 at 479.) Each of the working cylinders can be actuated to adjust the height of the attached caterpillar relative to the chassis.

STABLE PLATFORM

– Four leg posts with position sensors independently adjust and provide powered vertical movement to maintain desired height

(Ex. 20 at 7.)

116. Each of the lifting columns includes two telescoping hollow cylinders.

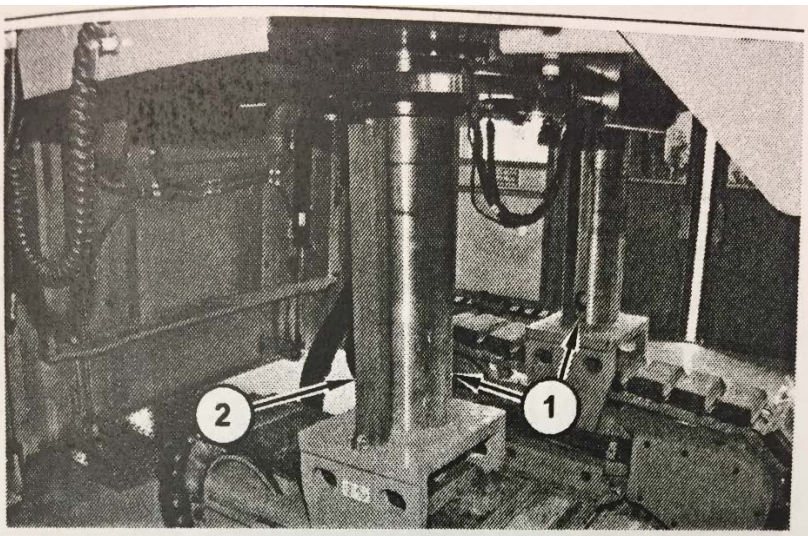


Illustration 33 g06073155

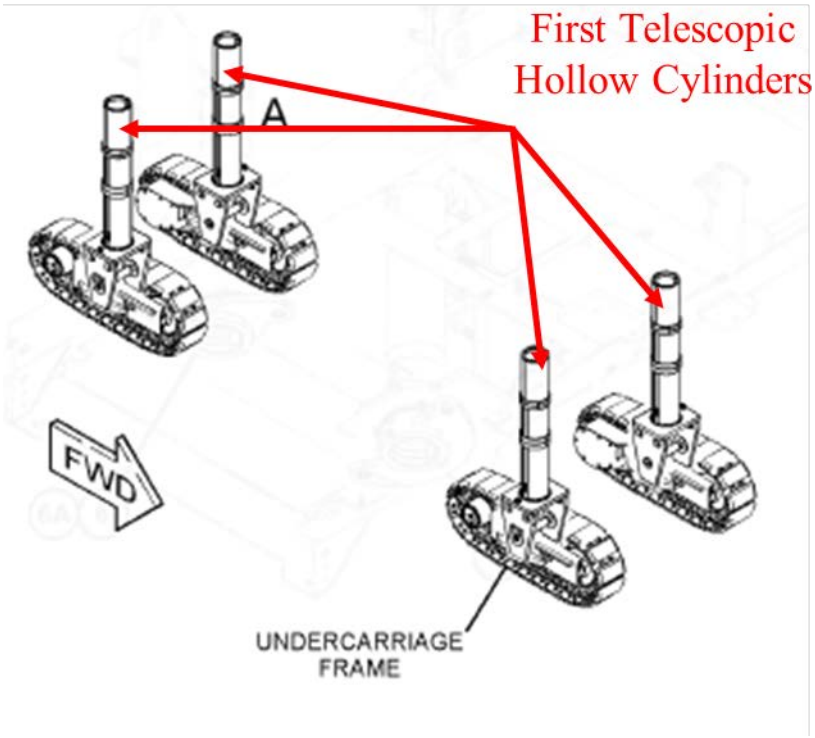
Machine Corners

(1) Leg elevation cylinders
(2) Cylinder service locks

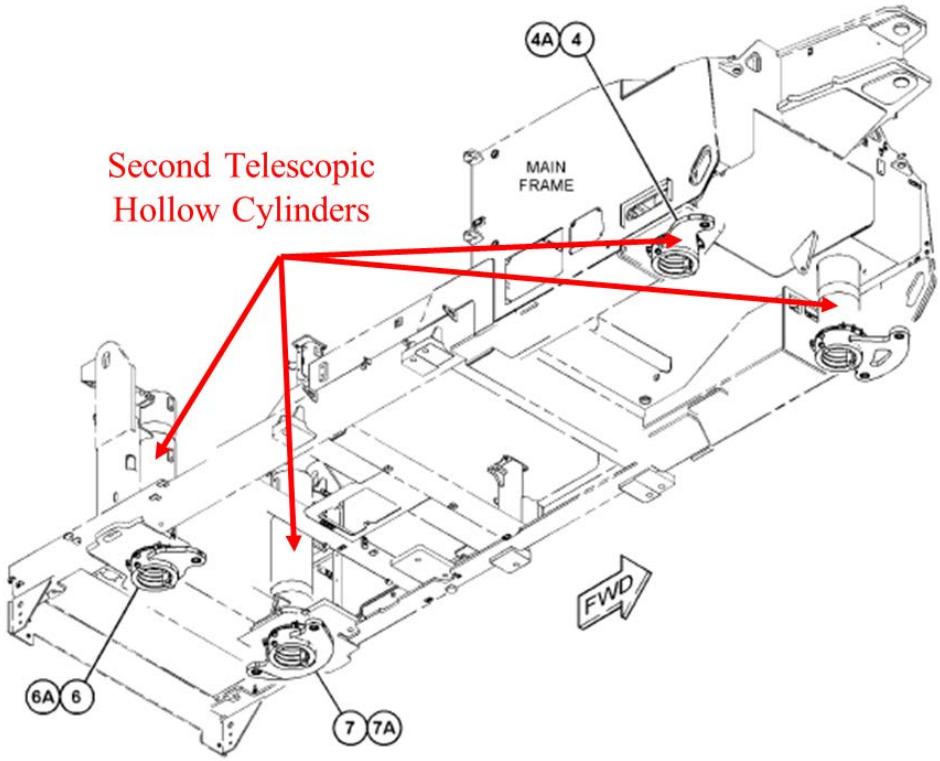
The machine stands on four leg elevation cylinders (1). The cylinders are at the front and rear of the machine. The rear leg cylinders are shown in Illustration 33 .

Leg elevation cylinders (1) hydraulically controlled to adjust the height and attitude of the machine. The machine is leveled or adjusted for grade and slope using these cylinders.

(Ex. 23 at 23.) The figure below shows the first of the two telescoping hollow column members.

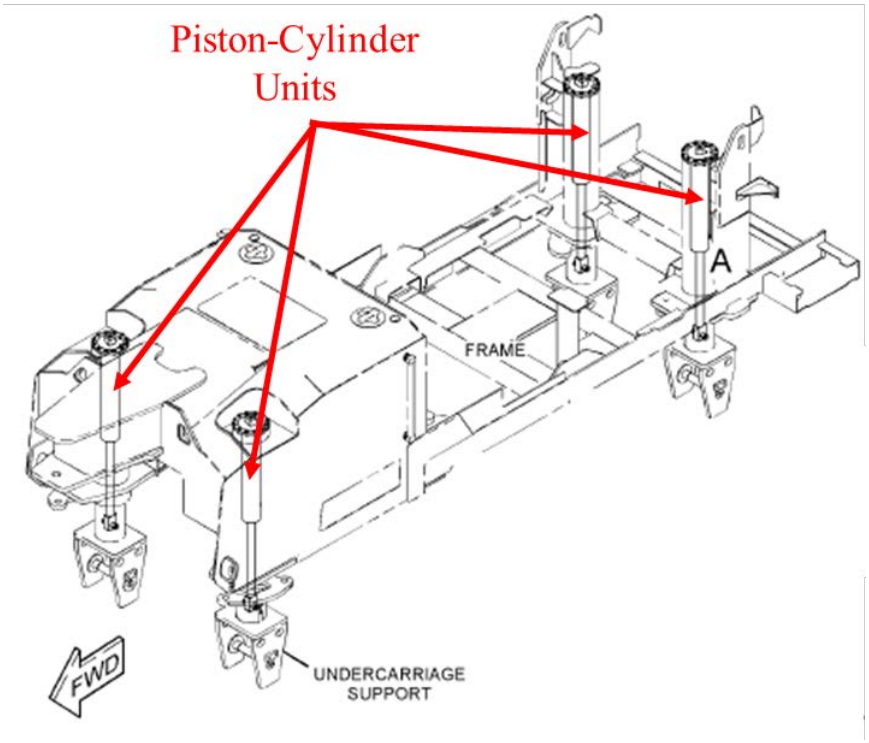


(Ex. 21 at 457.) The figure below shows the second of the two telescoping hollow column members.



(Ex. 21 at 468.)

117. At least one piston-cylinder unit is located within each telescoping hollow cylinders.



(Ex. 21 at 479 (designating the piston-cylinder units as "CYLINDER GP – HYDRAULIC").) Actuation of the piston-cylinder unit causes telescoping of the hollow cylinders relative to one another to allow individual adjustment in height of the lifting columns relative to the machine frame.

During an all-legs LOWER command, left front leg control valve (14) and right front leg control valve (16) shift. This action directs oil to the rod end of front elevation cylinders (2) and (5). Rear leg control valve (22) and rear leg speed valve (21) also shift. This action directs oil to the rod end of rear elevation cylinders (6) and (9).

In the front leg circuits, oil from control valves (14) and (16) is directed to shuttle valve (13) in each circuit. The shuttle valves direct the cylinder actuation pressure to one side of compensator valves (15). This pressure acts to open the compensator valve allowing full supply oil flow to the front leg cylinders.

In the rear leg circuit, oil flow to the rear leg cylinders is controlled by rear leg speed valve (21). During the all legs LOWER command, the speed valve is adjusted by the machine ECM. The ECM monitors the leg cylinder position sensors for elevation location and speed. The ECM controls the rear leg speed valve to match front and rear leg elevation changes.

(Ex. 23 at 45-46.)

118. Each lifting column has a lifting position corresponding to a position of one of the two telescoping hollow cylinders relative to the other of the two telescoping hollow cylinders. The Service Manual describes various lifting positions, or "leg positions", as corresponding to extensions of the hydraulic cylinders in association with the telescoping column members.

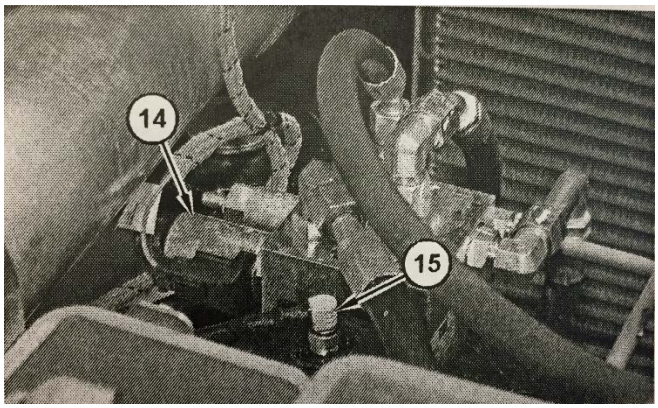
The ECM uses the sensor signals to determine 5 preset leg positions as follows:

- In the SERVICE HEIGHT (fully extended) position, the cylinder extension is 708.0 mm (27.9 inch) and the PWM signal from the sensor is 89.8 percent.
- In the PRE-SERVICE position, the cylinder extension is 658.0 mm (25.9 inch) and the PWM signal from the sensor is 84.1 percent.
- In the PRE-SCRATCH position, the cylinder extension is 419.0 mm (16.5 inch) and the PWM signal from the sensor is 57.2 percent.
- In the SCRATCH position, the cylinder extension is 369.0 mm (14.5 inch) and the PWM signal from the sensor is 51.6 percent.
- In the fully retracted condition, the cylinder extension is 0.0 mm (0.0 inch) and the PWM signal from the sensor is 10.0 percent.

(Ex. 23 at 14.)

119. As suggested above, the lifting position of each lifting column is determined by a lifting position sensor coupled with elements of the lifting column that uses a pulse-width modulated (PWM) signal to communicate the lifting position to an electronic control module (ECM).

Leg position sensor (15) is a linear sensor that sends a pulse-width modulated (PWM) signal directly to the machine ECM. These sensors allow the ECM to monitor the vertical position of the machine to control the rotor cut depth.



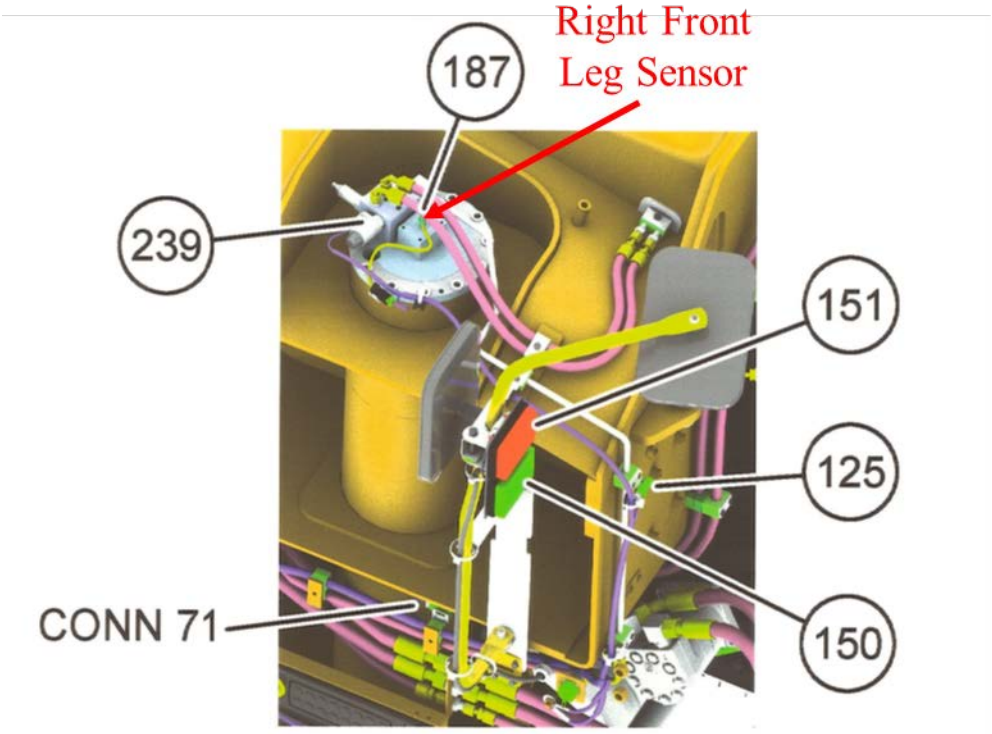
(Ex. 23 at 14.)

- Leg position sensors (9), (10), (11), and (12) are embedded in the four leg cylinders. Using a PWM signal, the sensors communicate actual leg position directly to the machine ECM.

(Ex. 23 at 27.)

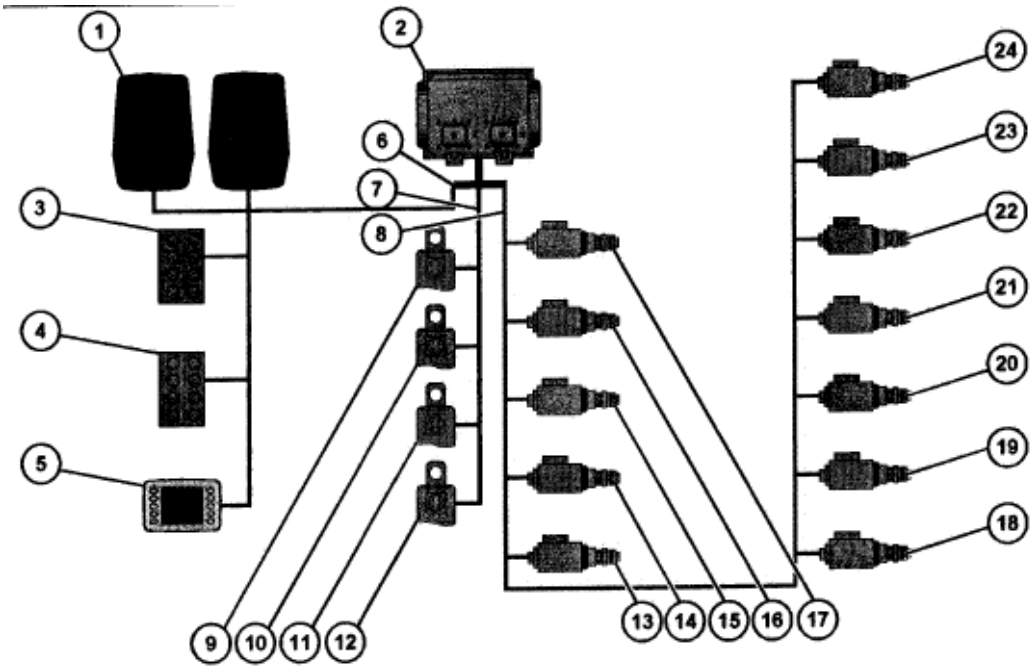
Leg position sensors (9), (10), (11), and (12) allow machine ECM (2) to monitor the vertical position of the machine to control the rotor cut depth. Five preset

(Ex. 23 at 28.) The right front leg is schematically highlighted below, along with right front leg height sensor (187) embedded in the respective leg cylinder.



(Schematic for PM620 and PM622 Cold Planar, Electrical System, Volume 2 of 4: Platform and Chassis [hereinafter Exhibit 25].) The right rear leg height sensor, left front leg height sensor, and left rear leg height sensor are similarly configured according to the same schematic volume.

120. Thus, these sensors provide a path signal pertaining to the lifting position of the lifting column to the ECM. A diagram of the electrical components of the machine elevation control system is reproduced below.



(Ex. 23 at 27.)

Machine ECM (2) analyzes information signals from input devices to determine machine elevation control.

(Ex. 23 at 27.)

121. As suggested above, the sensors are continuously detectable by the ECM. For example, a video walkaround of the PM 620 by A.J. Lee, Market Segment Manager – Cold Planers, Caterpillar, explains that "with that hydraulic system, we get that possible by "smart cylinders"—in position sensing cylinders. On this machine, just about every hydraulic cylinder is a position-sensing cylinder that knows what that cylinder is doing at all times." https://www.youtube.com/watch?v=sQWDXdaXPB8.

122. The ECM regulates the lifting positions of the lifting columns in response to the path signals detected by the sensors.

> The Cold Planer has four hydraulically adjustable legs, one on each corner of the machine. These legs control the height and angle of the machine. The leg heights can be manually adjusted by the operator or automatically adjusted by the grade & slope system.

(Ex. 24 at 8.)

> The system is now in Automatic mode and will drive the machine's hydraulics to maintain the intended Target values.

(Caterpillar Publication M0068306-01, Systems Operation Testing and Adjusting Troubleshooting, PM620 and PM622 Cold Planer Monitoring System/Grade and Slope (March 2016) [hereinafter Exhibit 26] at 59.) This is accomplished through signaling by the ECM, which adjusts height via the hydraulic system.

> Leg position sensors (9), (10), (11), and (12) allow machine ECM (2) to monitor the vertical position of the machine to control the rotor cut depth. Five preset leg positions are associated with the leg elevation system as follows:
>
> - In the fully retracted condition, the cylinder extension is 0.0 mm (0.0 inch) and the PWM signal from the sensor is 10.0 percent.
> - In the SCRATCH position, the cylinder extension is 369.0 mm (14.5 inch) and the PWM signal from the sensor is 51.6 percent.
> - In the PRE-SCRATCH position, the cylinder extension is 419.0 mm (16.5 inch) and the PWM signal from the sensor is 57.2 percent.
> - In the PRE-SERVICE position, the cylinder extension is 658.0 mm (25.9 inch) and the PWM signal from the sensor is 84.1 percent.
> - In the SERVICE HEIGHT (fully extended) position, the cylinder extension is 708.0 mm (27.9 inch) and the PWM signal from the sensor is 89.8 percent.

(Ex. 23 at 28.)

Machine ECM (2) generates output signals (8) to control the machine elevation. When leg adjustments are made, the following components receive direct output signals from the machine ECM:

- Rear leg speed solenoid (18)
- Rear leg lower solenoid (19)
- Rear leg raise solenoid (20)
- Right front leg lower solenoid (21)
- Right front leg raise solenoid (22)
- Left front leg lower solenoid (23)
- Left front leg raise solenoid (24)

(Ex. 23 at 28.)

To maintain the overall machine pitch and slope during an all-legs adjustment, the elevation system enters into a closed-loop control function. In this case, all leg position sensors (9), (10), (11), and (12) are used to manage relative cylinder positions.

(Ex. 23 at 29.)

123. Even in manual mode, the ECM utilizes the path signals detected by the sensors to regulate the lifting positions of the lifting columns.

When the front leg height is adjusted, leg position sensors (9) and (10) are used to determine cylinder position. Machine ECM (2) monitors the position to control elevation rate or limits as follows:

(Ex. 23 at 28.)

When the rear leg height is adjusted, leg position sensors (11) and (12) are used to determine cylinder position. Since the rear legs travel together, the average position of the cylinders is used for travel limit locations. Machine ECM (2) monitors the position to control elevation rate or limits as follows:

(Ex. 23 at 29.) When the system receives an all-legs adjustment command:

To maintain the overall machine pitch and slope during an all-legs adjustment, the elevation system enters into a closed-loop control function. In this case, all leg position sensors (9), (10), (11), and (12) are used to manage relative cylinder positions.

Machine ECM (2) determines all the cylinder positions when a command is generated. During a command, the ECM maintains equal velocity and relative position for each leg to keep the machine pitch and slope stable. The relative position of the cylinders is kept within ±15 mm (0.60 inch) from side to side (slope). The fore to aft (pitch) relative position is kept within ±30 mm (1.20 inch).

(Ex. 23 at 29.)

124. The Operation and Maintenance Manual describes the "All Legs Raise" control mode.

All Legs Raise (25)

All Legs Raise – When the button is pressed and held, all leg heights are first equalized then all four legs extend at the same rate. When raising, the legs will automatically stop extending at the pre-service height. Hold the button for 3 seconds in order to continue to raise the machine. Both the raise and lower indicators will illuminate when the legs have reached the service height.

(Ex. 22 at 49.) It also describes an "All Legs Lower" control mode.

All Legs Lower (32)

All Legs Lower – When the button is pressed, all leg heights are first equalized then all four legs retract at the same rate. When lowering, the legs will automatically stop retracting just before the side plates (in the lowered position) come in contact with the surface. Release the button, and press the button again in order to continue to lower the machine. Both the raise and lower indicators will illuminate when the legs have reached the service height.

(Ex. 22 at 49.) Both control modes are examples of the regulation of the lifting positions of the lifting columns in response to path signals detected by the lifting position measuring devices.

125. Accordingly, all the claim limitations of claim 1 of the ’592 patent are met by the Infringing Products.

126. Claim 5 is an exemplary dependent claim:

> The road construction machine of claim 1, wherein:
> the controller is operable to define a reference plane relative to the ground surface or traffic surface, and the controller is operable to store measured signals from the lifting position measuring devices corresponding to current lifting positions of the lifting columns and to thereby define a current spatial position of the machine frame relative to the reference plane as a reference spatial position of the machine frame.

127. As discussed above, during an all-legs adjustment, “the ECM maintains equal velocity and relative position for each leg to keep the machine pitch and slope stable.” (Ex. 23 at 28.) Furthermore, in a video of a working demonstration of the PM 620, Caterpillar discusses a feature called “obstacle jumping.” The video describes obstacle jumping as follows: “If there is an obstacle, using this automation system they can actually go up to that obstacle, come up out of the cut or up out of that previous grade, tram over that obstacle, and then return to[sic] that

machine to the previous cutting depth in auto helping to simplify the currently manual task." https://www.youtube.com/watch?v=2xLMaIxZyLs. On information and belief, to automate obstacle jumping, a controller must define a reference plane relative to the ground surface (i.e., the cut or previous grade) and then store measured signals from the lifting position measuring devices corresponding to their current positions once out of the cut and moving over the obstacle. This defines the machine's spatial position while out of the cut relative to the reference spatial position (i.e., the position while in the cut or previous grade). Without this functionality, the PM 620 would not be able to automatically return to the previous cutting depth.

128. Accordingly, all the claim limitations of claim 5 of the '592 patent are met by the Infringing Products.

129. Claim 15 is also exemplary:

The road construction machine of claim 1, wherein:
the controller is operable to regulate a working depth of the working drum at least in part in response to the path signals measured by the measuring devices.

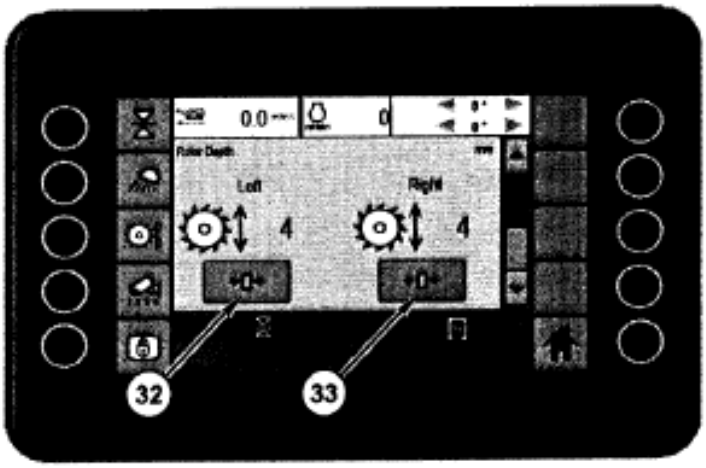
130. The rotor cut depth ("working depth of the working drum") is controlled based on the monitored vertical position of the machine, which is itself based at least in part on the signals produced by the leg position sensors.

Leg position sensor (15) is a linear sensor that sends a pulse-width modulated (PWM) signal directly to the machine ECM. These sensors allow the ECM to monitor the vertical position of the machine to control the rotor cut depth.

(Ex. 23 at 14.)

Leg position sensors (9), (10), (11), and (12) allow machine ECM (2) to monitor the vertical position of the machine to control the rotor cut depth. Five preset

(Ex. 23 at 28.) The display for the Caterpillar Products includes a "Rotor Depth Page" wherein the operator can input an intended Rotor Depth Set button for the left side (32) and for the right side (33).



(Ex. 26 at 101-102.) As the drum is fixed to the machine frame, the "working depth of the working drum" corresponds to the lifting positions of the lifting columns, wherein the controller is able to regulate the working depth of the drum based on the set point provided by the operator, further at least in part in response to the signals produced by the lifting position sensors.

131. Accordingly, all the claim limitations of claim 15 of the '592 patent are met by the Infringing Products.

132. Caterpillar has or has been, at all times relevant to this action, fully aware of and has or had actual knowledge of the '592 patent.

133. Caterpillar has made profits from their acts of patent infringement, and Plaintiff has suffered damages for which it is entitled to relief under 35 U.S.C. § 284.

134. Caterpillar's acts are or were deliberate and willful, and will continue unless enjoined by this Court.

135. As a result of the deliberate and willful nature of Caterpillar's acts, such damages should be increased to the maximum amount allowed by law, including an award of attorneys' fees.

COUNT 5: INFRINGEMENT OF U.S. PATENT NO. 9,010,871

136. Plaintiff hereby re-alleges and incorporates by reference the allegations of all preceding paragraphs of this Complaint as if fully set forth herein.

137. Caterpillar has and continues to directly or indirectly, and willfully, infringe one or more claims of the '871 patent by importing, making, distributing, using, offering to sell, or selling one or more of the Infringing Products.

138. Caterpillar has engaged in activities which constitute direct infringement of at least claims 1, 2, 5, and 13-15, 18 and 20 of the '871 patent, in violation of U.S.C. § 271(a).

139. Upon information and belief, Caterpillar's customers that have purchased the Infringing Products have and continue to engage in activities which constitute direct infringement of at least claims 23-25, 34, and 35 of the '871 patent, in violation of 35 U.S.C. § 271(a).

140. Caterpillar has and is inducing infringement of the '871 patent by actively and knowingly inducing purchasers of the Infringing Products to use the Infringing Products in a way that infringes at least claims 23-25, 34, and 35 of the '871 patent, in violation of 35 U.S.C. § 271(b). As demonstrated below, operation of the Infringing Products inherently practices at least claims 23-25.

141. Claim 1 of the '871 patent is exemplary:

A road construction machine, comprising:
a machine frame;
a working drum supported from the machine frame for working a ground surface or traffic surface;

a plurality of ground engaging supports for supporting the construction machine on the ground surface or traffic surface;

a plurality of lifting columns, each one of the lifting columns being connected between the machine frame and one of the ground engaging supports, each one of the lifting columns including two telescoping hollow column members and at least one piston-cylinder unit located within the telescoping hollow column members for adjusting a height of the lifting column so that each one of the lifting columns is individually adjustable in height relative to the machine frame, each lifting column having a lifting position corresponding to a position of one of the two telescoping hollow column members relative to the other of the two telescoping hollow column members;

a plurality of lifting position measuring devices, each lifting position measuring device being coupled with elements of one of the lifting columns, which elements are capable of being displaced relative to one another in accordance with the lifting position of the lifting column in such a manner that a path signal pertaining to the lifting position of the lifting column is continuously detectable by the measuring device.

142. For the reasons discussed above in relation to claim 1 of the ’592 patent, all the limitations of claim 1 of the ’871 patent are met by the Infringing Products.

143. Claim 23 of the ’871 patent is also exemplary:

A method of operating a road construction machine, the machine including a machine frame, a working drum supported from the machine frame, a plurality of ground engaging supports, and a plurality of lifting columns connected between the machine frame and the ground engaging supports, the method comprising:

detecting a lifting position of each of the lifting columns and continuously generating a path signal for each lifting column corresponding to the lifting positions of each lifting column.

144. Exemplary dependent claims include claims 24 and 25.

145. Claim 24 recites:

The method of claim 23, further comprising:

receiving the path signals in a controller; and regulating the lifting positions of the lifting columns with the controller in response to the path signals received by the controller.

146. Claim 25 recites:

The method of claim 24, further comprising:

defining a reference plane with the controller relative to a ground surface, and storing path signals received by the controller and thereby defining a current spatial position of the machine frame relative to the reference plane as a reference spatial position of the machine frame.

147. Claim 34 recites:

The method of claim 24, wherein:
the regulating step further comprises regulating a working depth of the working drum at least in part in response to the path signals received by the controller.

148. For the reasons discussed above in relation to claims 1, 5, and 15 of the ’592 patent, all the limitations of claim 23-25 of the ’871 patent are met by operation of the Infringing Products.

149. Caterpillar has or has been, at all times relevant to this action, fully aware of and has or had actual knowledge of the ’871 patent.

150. Caterpillar has made profits from its acts of patent infringement, and Plaintiff has suffered damages for which it is entitled to relief under 35 U.S.C. § 284.

151. Caterpillar’s acts are or were deliberate and willful, and will continue unless enjoined by this Court.

152. As a result of the deliberate and willful nature of Caterpillar’s acts, such damages should be increased to the maximum amount allowed by law, including an award of attorneys’ fees.

COUNT 6: INFRINGEMENT OF U.S. PATENT NO. 9,656,530

153. Plaintiff hereby re-alleges and incorporates by reference the allegations of all preceding paragraphs of this Complaint as if fully set forth herein.

154. Caterpillar has and continues directly or indirectly, and willfully, infringe one or more claims of the ’530 patent by importing, making, distributing, using, offering to sell, or selling one or more of the Infringing Products.

155. Caterpillar has engaged in activities which constitute direct infringement of at least claims 1-7, 13-24, and 26 of the ’530 patent, in violation of U.S.C. § 271(a).

156. Claim 1 of the ’530 patent is exemplary:

A road construction machine, comprising:
a machine frame;
a working drum supported from the machine frame for working a ground surface or traffic surface;
a plurality of ground engaging supports for supporting the construction machine on the ground surface or traffic surface;
a plurality of lifting columns, each one of the lifting columns being connected between the machine frame and one of the ground engaging supports, each one of the lifting columns including two telescoping hollow column members and at least one piston-cylinder unit located within the telescoping hollow column members for adjusting a height of the lifting column so that each one of the lifting columns is adjustable in height relative to the machine frame, each lifting column having a lifting position corresponding to a position of one of the two telescoping hollow column members relative to the other of the two telescoping hollow column members; and
a plurality of lifting position sensors, each lifting position sensor being coupled with elements of one of the lifting columns, which elements are capable of being displaced relative to one another in accordance with the lifting position of the lifting column in such a manner that a signal pertaining including information on a current lifting position of a column is produced by the lifting position sensor, wherein each of the lifting position sensors is connected to the at least one piston cylinder unit located within its associated lifting column.

157. For the reasons discussed above in relation to the claims of the ’592 patent, all the limitations of claim 1 of the ’530 patent are met by the Infringing Products.

158. Caterpillar has or has been, at all times relevant to this action, fully aware of and have or had actual knowledge of the ’530 patent.

159. Caterpillar has made profits from its acts of patent infringement, and Plaintiff has suffered damages for which it is entitled to relief under 35 U.S.C. § 284.

160. Caterpillar’s acts are or were deliberate and willful, and will continue unless enjoined by this Court.

161. As a result of the deliberate and willful nature of Caterpillar’s acts, such damages should be increased to the maximum amount allowed by law, including an award of attorneys’ fees.

COUNT 7: INFRINGEMENT OF U.S. PATENT NO. 8,308,395

162. Plaintiff hereby re-alleges and incorporates by reference the allegations of all preceding paragraphs of this Complaint as if fully set forth herein.

163. Caterpillar has and continues to directly or indirectly, and willfully, infringe one or more claims of the ’395 patent by importing, making, distributing, using, offering to sell, or selling one or more of the Infringing Products.

164. Caterpillar has engaged in activities which constitute direct infringement of at least claims 1, 3, 6, 8, 10, 11, 13, 16, 17, and 19 of the ’395 patent, in violation of U.S.C. § 271(a).

165. Upon information and belief, Caterpillar’s customers that have purchased the Infringing Products have and continue to engage in activities which constitute direct infringement of at least claims 20, 22, 24, 26, and 27 of the ’395 patent, in violation of 35 U.S.C. § 271(a).

166. Caterpillar has and is inducing infringement of the ’395 patent by actively and knowingly inducing purchasers of the Infringing Products to use the Infringing Products in a way that infringes at least claims 20, 22, 24, 26, and 27 of the ’395 patent, in violation of 35 U.S.C. § 271(b). Use of the “hot swapping” function described below inherently practices at least claims 20, 22, 24, 26, and 27 of the ’395 patent.

167. Claim 1 of the ’395 patent is exemplary:

A road construction machine for the treatment of road surfaces, comprising:
a milling drum, the milling drum being position adjustable with regard to at least one position characteristic selected from the group consisting of milling depth of the drum and slope of the drum; and
a leveling system configured to control the at least one position characteristic, the leveling system including:

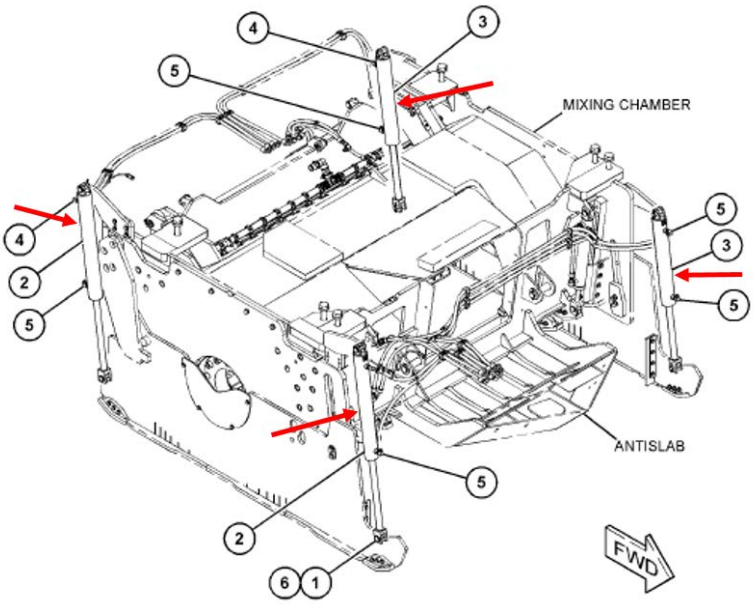
a plurality of selectable sensors, each sensor configured to sense a current actual value of an operating parameter corresponding to at least one of the milling depth of the drum and the slope of the drum;

a plurality of indication and setting devices, each of the indication and setting devices being associatable with at least one of the plurality of selectable sensors, each indication and setting device being operable to indicate the current actual value of and to set a set value for each operating parameter sensed by its associated sensor or sensors;

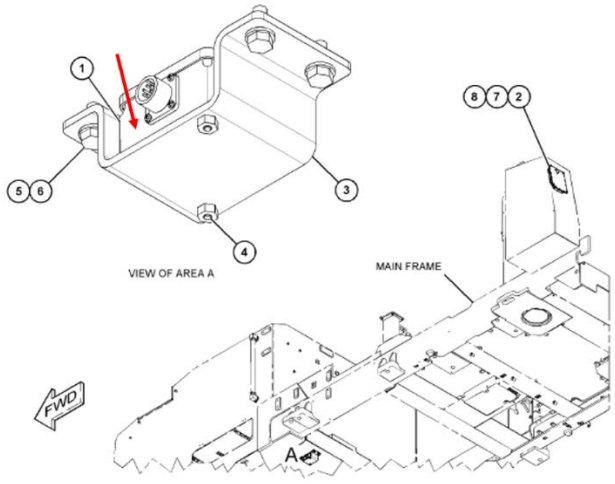
a controller and switchover system being configured to switch over from control based upon a first selected subset of the plurality of selectable sensors to control based upon a second selected subset during milling operation without interruption of the milling operation and without any erratic alteration of the at least one adjustment value, the second selected subset exchanging at least one replacement sensor not in the first subset for at least one replaced sensor that was in the first subset.

168. As discussed above, the Infringing Products are milling machines with a height-adjustable milling drum allowing for adjustment of milling depth and, by way of independent adjustment of the legs, slope of the drum.

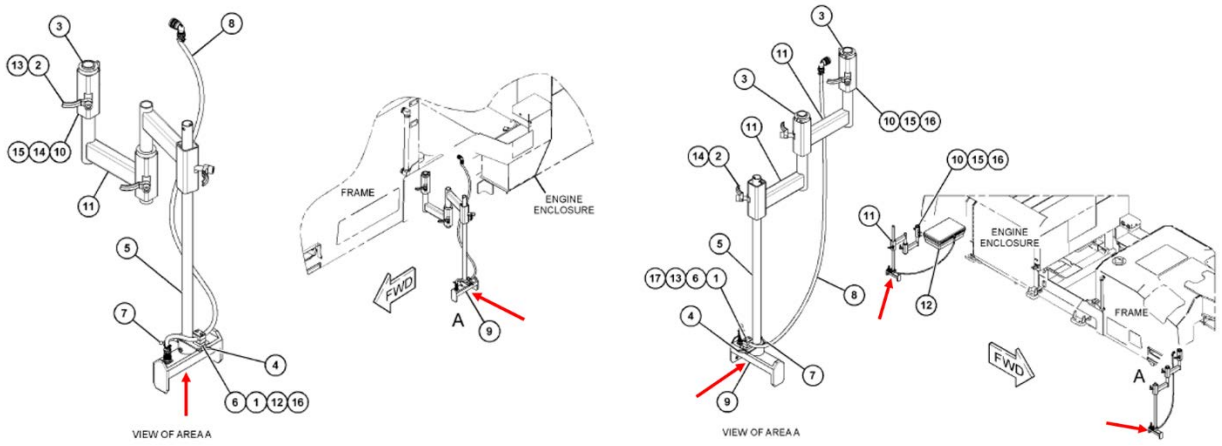
169. The Infringing Products possess a leveling system configured to control milling depth and the slope of the drum. The Infringing Products have numerous sensors configured to sense the milling depth of the drum or the slope of the drum. Each side plate (encloses the area to the sides of the milling drum) is height-adjustable via hydraulic cylinders equipped with smart sensors. Exhibit 4 indicates that these hydraulic cylinders (red arrows and designated “2” for right side or “3” for left side) contain a linear position sensor (part # 419-3871).



(Ex. 21 at 470.) Exhibit 4 further indicates that the Infringing Products are equipped with an inertial sensor (red arrow and designated "1"; part # 433-6936) mounted below the frame and in front of the milling drum, which would allow for measurement of the milling drum's slope.



(Ex. 21 at 263.) Exhibit 4 additionally indicates that optional sonic sensors (red arrows and designated "9"; part # 372-0971) may be mounted to the infringing products for "grade control."



(Ex. 21 at 317, 319.)

170. The Infringing Products possess a plurality of indication and setting devices, each of which can be associated with at least one of the sensors to indicate the actual current value of and to set a value for milling depth or slope. Exhibit 20 discusses CAT Grade Control, a "[s]ystem [that] communicates directly with position-sensing hydraulic cylinders, slope sensors and processors to ensure optimal precision." (Ex. 20 at 12.) A photograph of an operating panel of the Infringing Devices is reproduced below. On the left side of the panel, an actual current value (the red 0.5%) and a set ("target") value (the larger black 0.8%) of a slope sensor (red square) can be seen. On the right side of the panel, an actual current value (the green -121 mm) and a target value (the black -120 mm) of right side plate (blue square) can be seen. (*See* Ex. 26 at 31.)

(Ex. 20 at 12.) Furthermore, the actual values for additional sensors are displayed in smaller text below the selected sensor information. The values that can be displayed include those for the cross-slope sensor, left and right sonic sensors, left and ride side plate sensors, left and right inboard sensors, left and right sonic string sensors, and averages of combinations thereof. (Ex. 26 at 38.) As seen above, the cross slope is displayed as 0.6%, and the depth of the left side plate is displayed as -42 mm. The buttons corresponding to the paired up and down arrows on the upper left and upper right sides allow the operator to adjust the target value for the selected sensor. (Ex. 26 at 29-30.) Thus, the left side and right side each constitute an indication and setting device.

171. Adjustment of the target value causes the milling depth or slope to increase or decrease accordingly. This operation causes the sensed current actual value of the milling depth or slope to approach the target value. As seen above, the operator has set the value of the right side plate to -120 mm. As a result, the right side plate has changed height to -121 mm, which approaches the set value of -120 mm. Thus, operator input into the indication and setting device that changes the target value causes the controller and switchover system to adjust the milling depth or slope. A Caterpillar marketing video discusses the "grade and slope control system" that "allows operators to easily set up grade as well as quickly and accurately change cut depth

and or percentage of slope during operation." https://www.youtube.com/watch?v=2xLMaIxZyLs.

172. The controller and switchover system also allows the operator to switch over from control based upon a first subset of sensors to control based on a second subset of sensors. *See generally* (Ex. 26 at 50-51.) In the photograph above, the first subset of sensors would be the slope sensor set to 0.8% and the right side plate sensor set to -120 mm. A second subset of sensors could be the left side plate sensor currently measuring -42 mm and the right side plate sensor set to -120 mm. The Caterpillar marketing video also discusses this feature: "This system also allows the operators to change between grade sensors, what we would call hot swapping. If the grade reference changes, the operator can swap between the side plate to the inboard ski or the sonic averaging system." https://www.youtube.com/watch?v=2xLMaIxZyLs.

173. Accordingly, all the limitations of claim 1 of the '395 patent are met by the Infringing Products.

174. Claim 3 is an exemplary dependent claim:

> The road construction machine of claim 1, wherein: the controller and switchover system is operable to set a set value for an operating parameter for the replacement sensor to the current actual value for the operating parameter of the replacement sensor.

175. Claim 3 is directed to one of several preferred techniques for revising the values of the replacement sensor so as to avoid interruption of the milling operation on switchover. The technique of claim 3 sets the set value for the replacement sensor to the current actual value for the replacement sensor. The Infringing Products utilize this technique.

176. Accordingly, all the limitations of claim 3 of the '395 patent are met by the Infringing Products.

177. Claim 20 of the '395 patent is also exemplary:

A method of controlling at least one position characteristic of a milling drum of a road construction machine, the at least one position characteristic being from the group consisting of the milling depth of the drum and the slope of the drum, the method comprising:

(a) setting a set value for an operational parameter of at least one sensor, the operational parameter corresponding to at least one of the milling depth of the drum and the slope of the drum;

(b) conducting a milling operation;

(c) during the milling operation, sensing a current actual value of the operational parameter of the at least one sensor;

(d) generating an adjustment value with a controller, the adjustment value correlating to a difference between the set value and the current actual value of the operational parameter of the at least one sensor;

(e) controlling the at least one position characteristic based on the adjustment value; and

(f) without interrupting the milling operation, switching over the control of the at least one position characteristic from control based at least in part on the at least one sensor to control based at least in part on a replacement sensor not included in the at least one sensor, without altering the adjustment value at the time of switching over.

178. For the same reasons discussed regarding claim 1, use of hot swapping during milling with the Infringing Products meets all the limitations of claim 20 of the ’395 patent.

179. Caterpillar is or has been, at all times relevant to this action, fully aware of and has or had actual knowledge of the ’395 patent.

180. Caterpillar has made profits from its acts of patent infringement, and Plaintiff has suffered damages for which it is entitled to relief under 35 U.S.C. § 284.

181. Caterpillar’s acts are or were deliberate and willful, and will continue unless enjoined by this Court.

182. As a result of the deliberate and willful nature of Caterpillar’s acts, such damages should be increased to the maximum amount allowed by law, including an award of attorneys’ fees.

COUNT 8: INFRINGEMENT OF U.S. PATENT NO. 7,946,788

183. Plaintiff hereby re-alleges and incorporates by reference the allegations of all preceding paragraphs of this Complaint as if fully set forth herein.

184. Caterpillar has and continues to directly or indirectly, and willfully, infringe one or more claims of the ’788 patent by importing, making, distributing, using, offering to sell, or selling one or more of the Infringing Products.

185. Caterpillar has engaged in activities which constitute direct infringement of at least claims 1, 3, 6-8, 10, 11, and 14 of the ’788 patent, in violation of U.S.C. § 271(a).

186. Upon information and belief, Caterpillar’s customers that have purchased the Infringing Products have and continue to engage in activities which constitute direct infringement of at least claims 15, 17, and 19 of the ’788 patent, in violation of 35 U.S.C. § 271(a).

187. Caterpillar has and is inducing infringement of the ’788 patent by actively and knowingly inducing purchasers of the Infringing Products to use the Infringing Products in a way that infringes at least claims 15, 17, and 19 of the ’788 patent, in violation of 35 U.S.C. § 271(b). Use of the “hot swapping” function described above inherently practices at least claims 15, 17, and 19 of the ’788 patent.

188. Claim 1 of the ’788 patent is exemplary:

> A road construction machine for the treatment of road surfaces, comprising:
> a milling drum, the milling drum being position adjustable with regard to milling depth and/or slope; and
> a leveling system operable to control the milling depth and/or slope, the leveling system including:
> a plurality of selectable sensors for sensing current actual values of operating parameters including the milling depth and/or the slope of the milling drum relative to a reference surface;
> a plurality of indication and setting devices, each of the indication and setting devices being associatable with at least one of the plurality of selectable sensors, each indication and

setting device being operable to indicate the current actual value of and to set a set value for the operating parameter sensed by its associated sensor;

a controller operable to control the milling depth and/or the slope of the milling drum conditioned on set values and sensed current actual values of the operating parameters sensed by a selected subset of the plurality of selectable sensors by returning at least one adjustment value to adjust the milling depth and/or the slope of the milling drum so that the sensed current actual values of the operating parameters approach the set values for the selected subset of the plurality of selectable sensors;

a switchover device operable to switch over from control based upon a first selected subset of the plurality of selectable sensors to control based upon a second selected subset, the second selected subset exchanging at least one replacement sensor not in the first subset for at least one replaced sensor that was in the first subset; and

the controller being operable to effect switchover from control based upon the first selected subset of selectable sensors during milling operation without interruption of the milling operation and without any erratic alteration of the at least one adjustment value for adjusting the milling depth and/or slope of the milling drum.

189. Claim 15 of the ’788 patent is also exemplary:

A method of controlling the milling depth and/or the slope of a milling drum of a road construction machine, the method comprising:

(a) setting a set value for an operational parameter of at least one sensor, the operational parameter being milling depth of the milling drum associated with the at least one sensor and/or slope of the drum;

(b) conducting a milling operation;

(c) during the milling operation, sensing a current actual value of the operational parameter of the at least one sensor relative to a reference surface;

(d) generating an adjustment value with a controller, the adjustment value correlating to a difference between the set value and the current actual value of the operational parameter of the at least one sensor;

(e) controlling the milling depth and/or the slope of the milling drum based on the adjustment value; and

(f) without interrupting the milling operation, switching over the control of the milling depth from control based at least in part on the at least one sensor to control based at least in part on a replacement sensor not included in the at least one sensor, without altering the adjustment value at the time of switching over.

190. For the same reasons discussed regarding the ’395 patent, the Infringing Products or use thereof meets all the limitations of claims 1 and 15 of the ’788 patent.

191. Caterpillar has or has been, at all times relevant to this action, fully aware of and have or had actual knowledge of the ’788 patent.

192. Caterpillar has made profits from its acts of patent infringement, and Plaintiff has suffered damages for which it is entitled to relief under 35 U.S.C. § 284.

193. Caterpillar's acts are or were deliberate and willful, and will continue unless enjoined by this Court.

194. As a result of the deliberate and willful nature of Caterpillar's acts, such damages should be increased to the maximum amount allowed by law, including an award of attorneys' fees.

COUNT 9: INFRINGEMENT OF U.S. PATENT NO. 8,511,932

195. Plaintiff hereby re-alleges and incorporates by reference the allegations of all preceding paragraphs of this Complaint as if fully set forth herein.

196. Caterpillar has and continues to directly or indirectly, and willfully, infringe one or more claims of the '932 patent by importing, making, distributing, using, offering to sell, or selling one or more of the Infringing Products.

197. Caterpillar has engaged in activities which constitute direct infringement of at least claims 9-12, 14, and 17 of the '932 patent, in violation of U.S.C. § 271(a).

198. Upon information and belief, Caterpillar's customers that have purchased the Infringing Products have and continue to engage in activities which constitute direct infringement of at least claims 1 and 2 of the '932 patent, in violation of 35 U.S.C. § 271(a).

199. Caterpillar has and is inducing infringement of the '932 patent by actively and knowingly inducing purchasers of the Infringing Products to use the Infringing Products in a way that infringes at least claims 1 and 2 of the '932 patent, in violation of 35 U.S.C. § 271(b). Use of the "hot swapping" function described above inherently practices at least claims 1 and 2 of the '932 patent.

200. Claim 9 of the ’932 patent is exemplary:

A road construction machine for the treatment of road surfaces, comprising:
a milling drum, the milling drum being position adjustable with regard to at least one position characteristic selected from the group consisting of milling depth of the drum and slope of the drum; and
a leveling system configured to control the at least one position characteristic, the leveling system including:
a plurality of selectable sensors, each sensor configured to sense a current actual value of an operating parameter corresponding to at least one of the milling depth of the drum and the slope of the drum;
a plurality of indication and setting devices, each of the indication and setting devices being associatable with at least one of the plurality of selectable sensors, each indication and setting device being operable to indicate the current actual value of and to set a set value for each operating parameter sensed by its associated sensor or sensors;
a controller and switchover system configured to control the at least one position characteristic conditioned on set values or values and sensed current actual value or values of the operating parameter or parameters sensed by a selected subset of the plurality of selectable sensors by returning at least one adjustment value to adjust the at least one position characteristic so that the sensed current actual value or values of the operating parameter or parameters approach the set value or values for the selected subset of the plurality of selectable sensors;
the controller and switchover system being configured to switch over from control based upon a first selected subset of the plurality of selectable sensors to control based upon a second selected subset during milling operation without interruption of the milling operation, the second selected subset exchanging at least one replacement sensor not in the first subset for at least one replaced sensor that was in the first subset; and
wherein the controller and switchover system is operable to set a set value for an operating parameter for the replacement sensor to the current actual value for the operating parameter of the replacement sensor.

201. Claim 1 of the ’932 patent is also exemplary:

A method of controlling at least one position characteristic of a milling drum of a road construction machine, the at least one position characteristic being from the group consisting of the milling depth of the drum and the slope of the drum, the method comprising:

(a) setting a set value for an operational parameter of at least one sensor, the operational parameter being the operational parameter corresponding to at least one of the milling depth of the drum and the slope of the drum;

(b) conducting a milling operation;

(c) during the milling operation, sensing a current actual value of the operational parameter of the at least one sensor;

(d) generating an adjustment value with a controller, the adjustment value correlating to a difference between the set value and the current actual value of the operational parameter of the at least one sensor;

(e) controlling the at least one position characteristic based on the adjustment value;

(f) without interrupting the milling operation, switching over the control of the at least one position characteristic from control based at least in part on the at least one sensor to control based at least in part on a replacement sensor not included in the at least one sensor; and

(g) setting a value for the operational parameter of the replacement sensor to a current measured actual value of the operational parameter of the replacement sensor.

202. For the same reasons discussed regarding the ’395 patent, the Infringing Products or use thereof meets all the limitations of claims 1 and 9 of the ’932 patent.

203. Caterpillar has or has been, at all times relevant to this action, fully aware of and has or had actual knowledge of the ’932 patent.

204. Caterpillar has made profits from its acts of patent infringement, and Plaintiff has suffered damages for which it is entitled to relief under 35 U.S.C. § 284.

205. Caterpillar’s acts are or were deliberate and willful, and will continue unless enjoined by this Court.

206. As a result of the deliberate and willful nature of Caterpillar’s acts, such damages should be increased to the maximum amount allowed by law, including an award of attorneys’ fees.

COUNT 10: INFRINGEMENT OF U.S. PATENT NO. 8,690,474

207. Plaintiff hereby re-alleges and incorporates by reference the allegations of all preceding paragraphs of this Complaint as if fully set forth herein.

208. Caterpillar has and continues to directly or indirectly, and willfully, infringe one or more claims of the ’474 patent by importing, making, distributing, using, offering to sell, or selling one or more of the Infringing Products.

209. Caterpillar has engaged in activities which constitute direct infringement of at least claims 19-21, 24, 26-28, and 31 of the ’474 patent, in violation of U.S.C. § 271(a).

210. Upon information and belief, Caterpillar's customers that have purchased the Infringing Products have and continue to engage in activities which constitute direct infringement of at least claims 1-3, 6, 8, 10-12, 15, 17, and 33 of the '474 patent, in violation of 35 U.S.C. § 271(a).

211. Caterpillar has and is inducing infringement of the '474 patent by actively and knowingly inducing purchasers of the Infringing Products to use the Infringing Products in a way that infringes at least claims 1-3, 6, 8, 10-12, 15, 17, and 33 of the '474 patent, in violation of 35 U.S.C. § 271(b). Use of the "hot swapping" function described above inherently practices at least claims 1-3, 6, 8, 10-12, 15, 17, and 33 of the '474 patent.

212. Claim 19 of the '474 patent is exemplary:

> A road construction machine for the treatment of road surfaces, comprising:
> a milling drum, the milling drum being position adjustable with regard to at least one position characteristic selected from the group consisting of milling depth of the drum and slope of the drum; and
> a leveling system configured to control the at least one position characteristic, the leveling system including:
> a plurality of selectable sensors, each sensor configured to sense a current actual value of an operating parameter corresponding to at least one of the milling depth of the drum and the slope of the drum;
> a plurality of indication and setting devices, each of the indication and setting devices being associable with at least one of the plurality of selectable sensors, each indication and setting device being operable to indicate the current actual value of and to set a set value for each operating parameter sensed by its associated sensor or sensors;
> a controller and switchover system configured to control the at least one position characteristic conditioned on set value or values and sensed current actual value or values of the operating parameter or parameters sensed by a selected subset of the plurality of selectable sensors by returning at least one adjustment value to adjust the at least one position characteristic so that the sensed current actual value or values of the operating parameter or parameters approach the set value or values for the selected subset of the plurality of selectable sensors;
> the controller and switchover system being configured to switch over from control based upon a first selected subset of the plurality of selectable sensors to control based upon a second selected subset during milling operation without interruption of the milling operation, the second selected subset exchanging at least one replacement sensor not in the first subset for at least one replaced sensor that was in the first subset; and

wherein the controller and switchover system is operable to change at least one of the set value of the operating parameter of the replacement sensor and the sensed current actual value of the operating parameter of the replacement sensor such that the adjustment value is unchanged at the time of switch over.

213. Claim 1 of the ’474 patent is also exemplary:

A method of controlling at least one position characteristic of a milling drum of a road construction machine, the at least one position characteristic being from the group consisting of the milling depth of the drum and the slope of the drum, the method comprising:

(a) setting a set value for an operational parameter of at least one sensor, the operational parameter corresponding to at least one of the milling depth of the drum and the slope of the drum;

(b) conducting a milling operation;

(c) during the milling operation, sensing a current actual value of the operational parameter of the at least one sensor;

(d) generating an adjustment value with a controller, the adjustment value correlating to a difference between the set value and the current actual value of the operational parameter of the at least one sensor;

(e) controlling the at least one position characteristic based on the adjustment value;

(f) without interrupting the milling operation, switching over the control of the at least one position characteristic from control based at least in part on the at least one sensor to control based at least in part on a replacement sensor not included in the at least one sensor; and

(g) changing at least one of a set value of an operational parameter of the replacement sensor and a current measured actual value of the operational parameter of the replacement sensor such that the adjustment value is unchanged at the time of switching over.

214. For the same reasons discussed regarding the ’395 patent, the Infringing Products or use thereof meets all the limitations of claims 1 and 19 of the ’474 patent.

215. Caterpillar has or has been, at all times relevant to this action, fully aware of and has or had actual knowledge of the ’474 patent.

216. Caterpillar has made profits from its acts of patent infringement, and Plaintiff has suffered damages for which it is entitled to relief under 35 U.S.C. § 284.

217. Caterpillar’s acts are or were deliberate and willful, and will continue unless enjoined by this Court.

218. As a result of the deliberate and willful nature of Caterpillar's acts, such damages should be increased to the maximum amount allowed by law, including an award of attorneys' fees.

COUNT 11: INFRINGEMENT OF U.S. PATENT NO. 9,624,628

219. Plaintiff hereby re-alleges and incorporates by reference the allegations of all preceding paragraphs of this Complaint as if fully set forth herein.

220. Caterpillar has and continues to directly or indirectly, and willfully, infringe one or more claims of the '628 patent by importing, making, distributing, using, offering to sell, or selling one or more of the Infringing Products.

221. Caterpillar has engaged in activities which constitute direct infringement of at least claims 1, 2, 5, 6, 9-20 of the '628 patent, in violation of U.S.C. § 271(a).

222. Caterpillar has engaged in activities which constitute direct infringement of at least claims 21, 22, and 27-29 of the '628 patent, in violation of U.S.C. § 271(g).

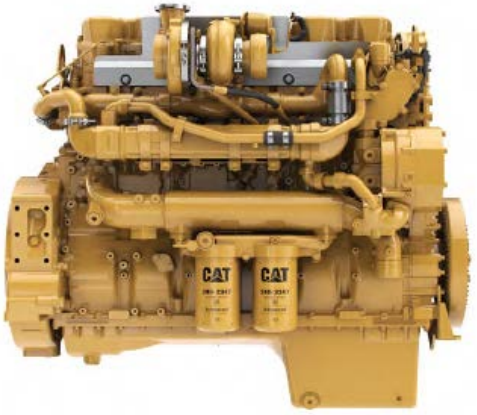
223. Claim 1 of the '628 patent is exemplary:

A construction machine for the treatment of ground surfaces, comprising:
a machine frame;
a work drum mounted supported from the machine frame and including exchangeable tools fastened to the work drum;
a drive line including a work motor and a transmission connecting the work motor to the work drum, the transmission including:
a belt drive including a motor-side pulley, a drum-side pulley, and at least one drive belt connecting the motor-side pulley to the drum-side pulley; and
a reduction gear arranged internally of the work drum and connected to the drum-side pulley; and
an auxiliary drive mounted at a location on the construction machine and including an auxiliary drive motor, the auxiliary drive having a first configuration in which the auxiliary drive motor is coupled to the work drum via at least a portion of the transmission to rotate the work drum, the auxiliary drive having a second configuration in which the auxiliary drive remains mounted at the location on the construction machine and the work drum can be rotated by the work motor.

224. As discussed previously, the Infringing Products are construction machines, with a machine frame, a milling drum, and a traction drive that includes a belt and pulley.

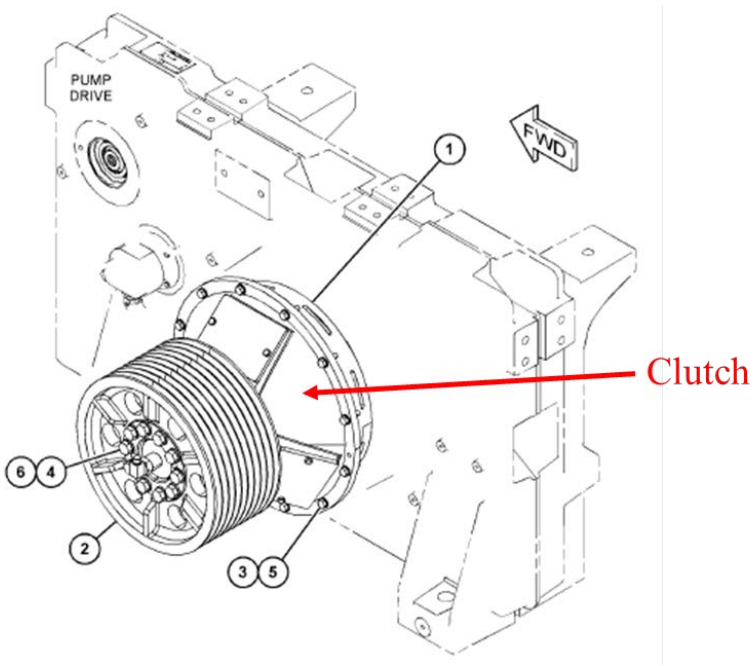
225. The "rotor [i.e., milling drum] has replaceable cutter bits (1) mounted in quick release tool holders." (Ex. 23 at 65; *see also* Ex. 19 at 190-192.)

226. The Infringing Products include a work motor and a transmission connecting the work motor to the work drum. The figure below depicts the drive engine for the work drum.



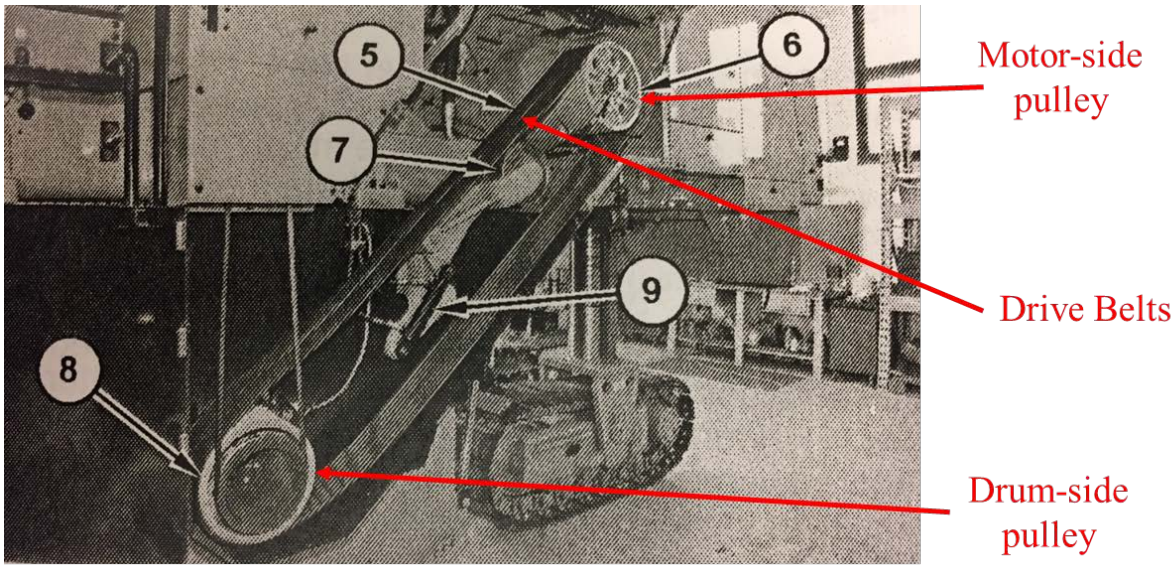
(Ex. 20 at 6.)

227. The work motor is operatively coupled to a heavy-duty dry clutch (Ex. 17 at 11) that engages a belt drive, which in turn drives the working drum.

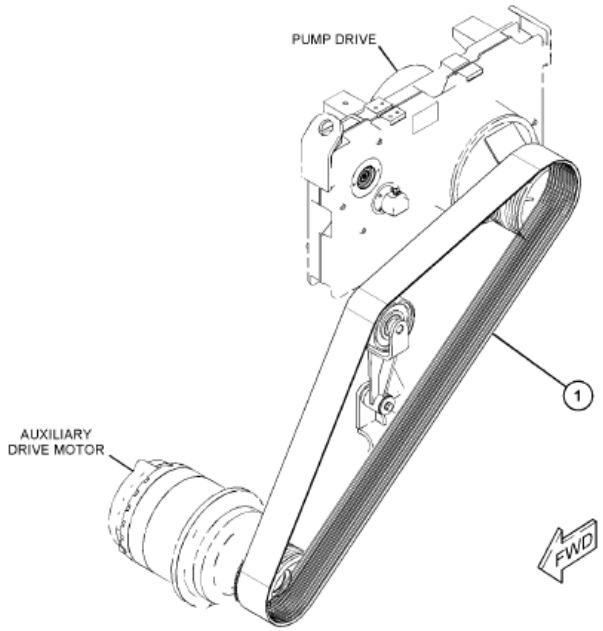


(Ex. 21 at 394.)

228. The belt drive includes a motor-side pulley ("upper sheave"; designated "6"), a drum-side pulley ("lower sheave"; designated "8"), and two drive belts connecting the motor-side pulley to the drum-side pulley (designated "5").

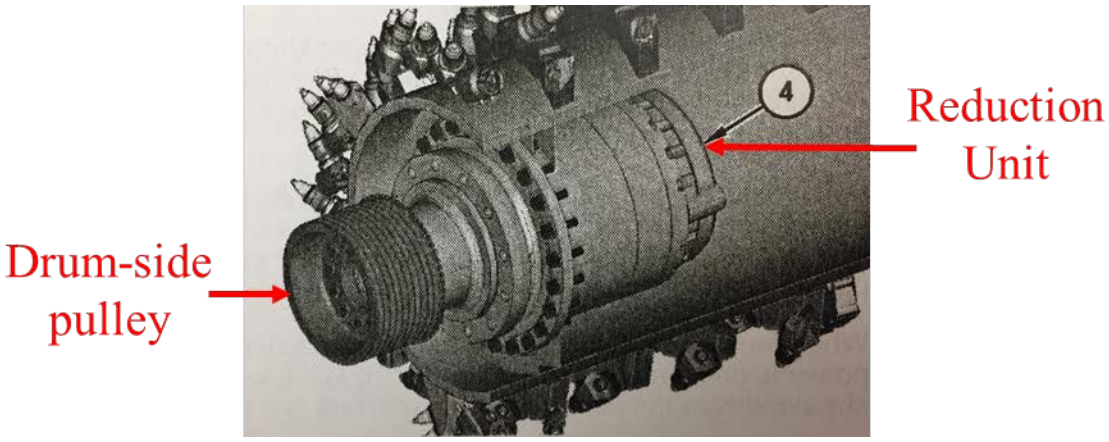


(Ex. 23 at 66.)



(Ex. 21 at 391.)

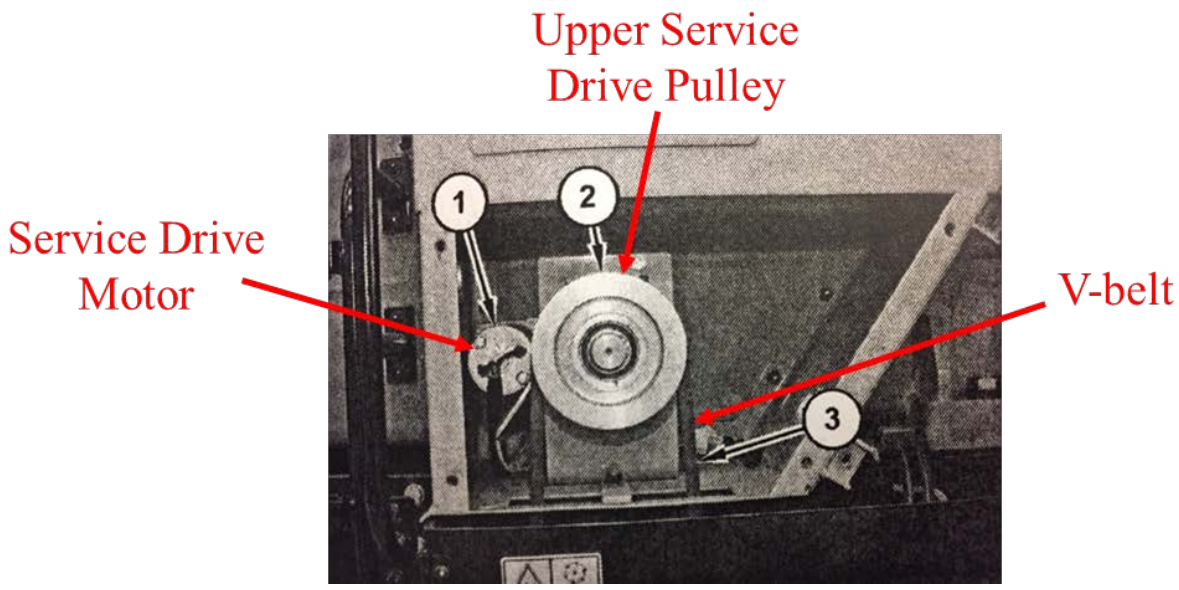
229. The Infringing Products have a reduction gear mounted in the work drum. "The rotor is driven by planetary reduction unit (4) mounted in the left end of the rotor drum." UENR6294 at 65.



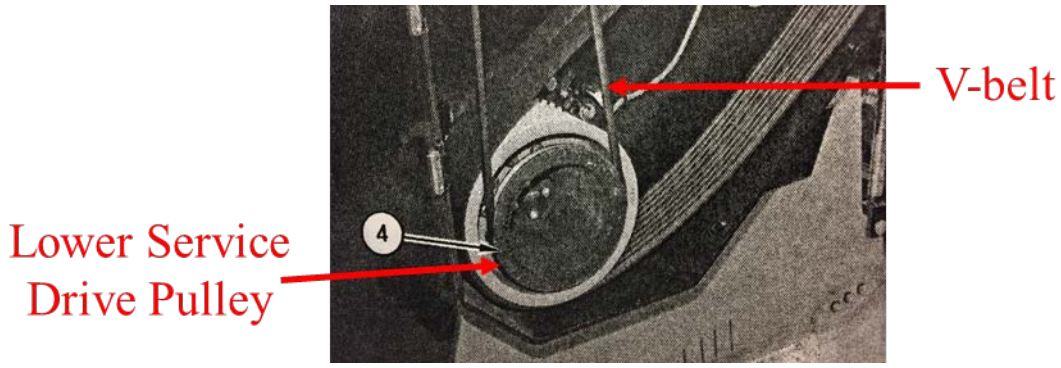
(Ex. 23 at 65.)

230. The Infringing Products may include an auxiliary drive, described as an "auxiliary rotor service drive." UENR6294 at 69. The auxiliary drive includes a service drive motor (designated "1"), an upper service drive pulley (designated "2"), a V-belt (designated "3), a

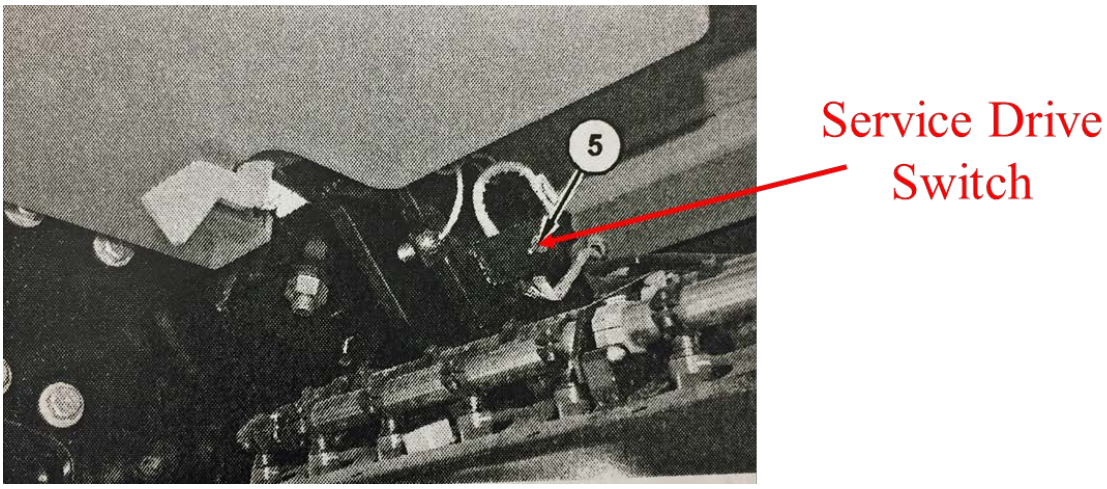
lower service drive pulley (designated "4"), and a service drive switch (designated "5"). (Ex. 23 at 69.)



(Ex. 23 at 69.) The lower service drive pulley is located adjacent to the drum-side pulley of the belt drive. (Ex. 23 at 69.)



(Ex. 23 at 69.) The service drive switch is mounted on a fixed location inside the milling drum housing.



(Ex. 23 at 69.)

231. As seen in the photographs above, the auxiliary drive motor (1) drives the upper drive service pulley (2), which is coupled to the lower service drive pulley (4) via the V-belt (3). The lower service drive pulley is bolted to the input shaft of the reduction gear, such that operation of the auxiliary drive motor rotates the work drum. The entire auxiliary drive remains mounted at a fixed location on the construction machine and is operated by the service drive switch (5). On information and belief, the auxiliary drive motor (1) is magnetically coupled to the upper drive service pulley (2). When switched on in the first configuration, the magnetic coupling connects the auxiliary drive motor (1) to the upper drive service pulley (2). Thus, in this first configuration, the auxiliary drive rotates the work drum. When switched off in the second configuration, the magnetic coupling disconnects the auxiliary drive motor from the upper drive service pulley (2). In this second configuration with the auxiliary drive uncoupled, the work drum can be rotated by the work motor.

232. Accordingly, all the claim limitations of claim 1 of the ’628 patent are met by the Infringing Products.

233. Claim 21 of the ’628 patent is exemplary:

A method of manufacturing a construction machine for the treatment of ground surfaces, comprising:

(a) providing a machine frame;

(b) mounting a work drum on the machine frame;

(c) mounting a work motor on the machine frame;

(d) connecting the work motor with the work drum via a transmission so that the work motor rotates the work drum at a first rotational speed when the work motor is activated, the transmission including:

a belt drive including a motor-side pulley, a drum-side pulley, and at least one drive belt connecting the motor-side pulley to the drum-side pulley; and

a reduction gear connected between the drum-side pulley and the work drum to reduce a rotational speed of the work drum relative to the drum-side pulley; and

(e) mounting an auxiliary drive at a location on the construction machine, the auxiliary drive being operably engaged with the transmission to drive at least a portion of the transmission so that the auxiliary drive can rotate the work drum at a second rotational speed less than the first rotational speed when the work drum is in a raised condition out of engagement with any ground surface.

234. For the reasons discussed above with regard to claim 1, all the claim limitations of claim 21 of the ’628 patent are met by the Infringing Products.

235. Caterpillar has made profits from its acts of patent infringement, and Plaintiff has suffered damages for which it is entitled to relief under 35 U.S.C. § 284.

COUNT 12: INFRINGEMENT OF U.S. PATENT NO. 9,644,340

236. Plaintiff hereby re-alleges and incorporates by reference the allegations of all preceding paragraphs of this Complaint as if fully set forth herein.

237. Caterpillar has and continues to directly or indirectly, and willfully, infringe one or more claims of the ’340 patent by importing, making, distributing, using, offering to sell, or selling one or more of the Infringing Products.

238. Caterpillar has engaged in activities which constitute direct infringement of at least claims 1-5, 7-12, and 14-17 of the ’340 patent, in violation of U.S.C. § 271(a).

239. Claim 1 of the ’340 patent is exemplary:

A construction machine, comprising:

a machine frame;

a milling drum mounted to rotate about a milling drum axis, the milling drum axis being fixed relative to the machine frame;

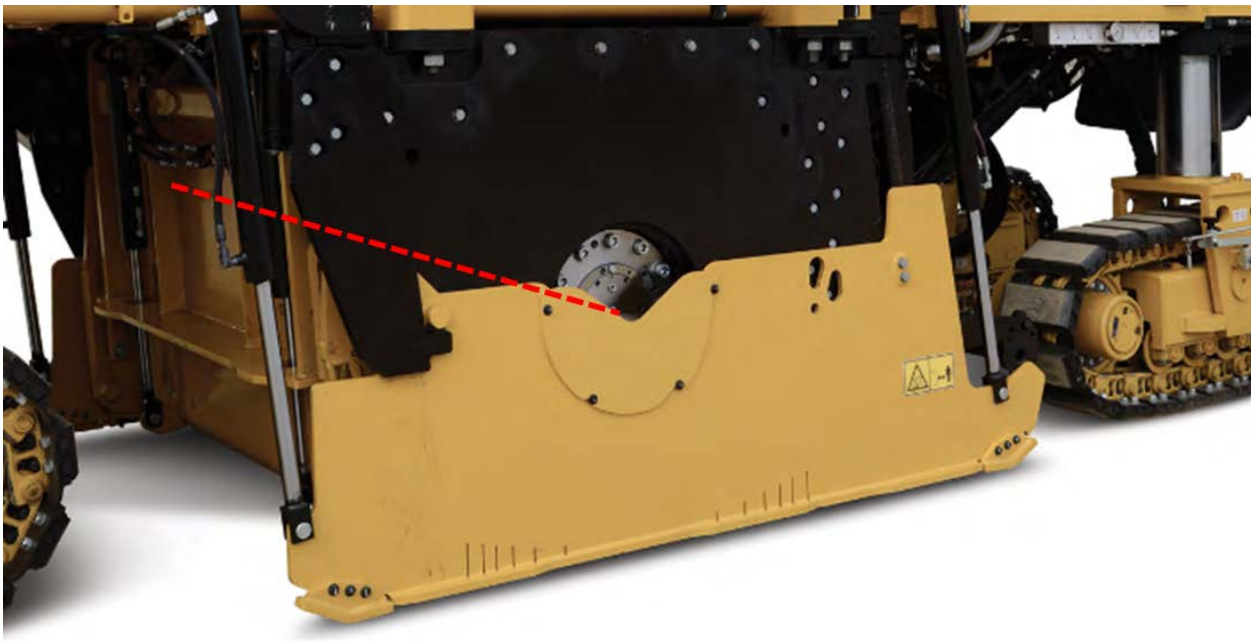
a scraper blade located behind the milling drum with reference to a direction of travel of the construction machine, the scraper blade including an upper part and a lower part, the lower part being movable in a sliding non-pivotal motion relative to the upper part;

a lifting actuator connected between the upper and lower parts to slide the lower part relative to the upper part between a downward extended position and an upward retracted position; and

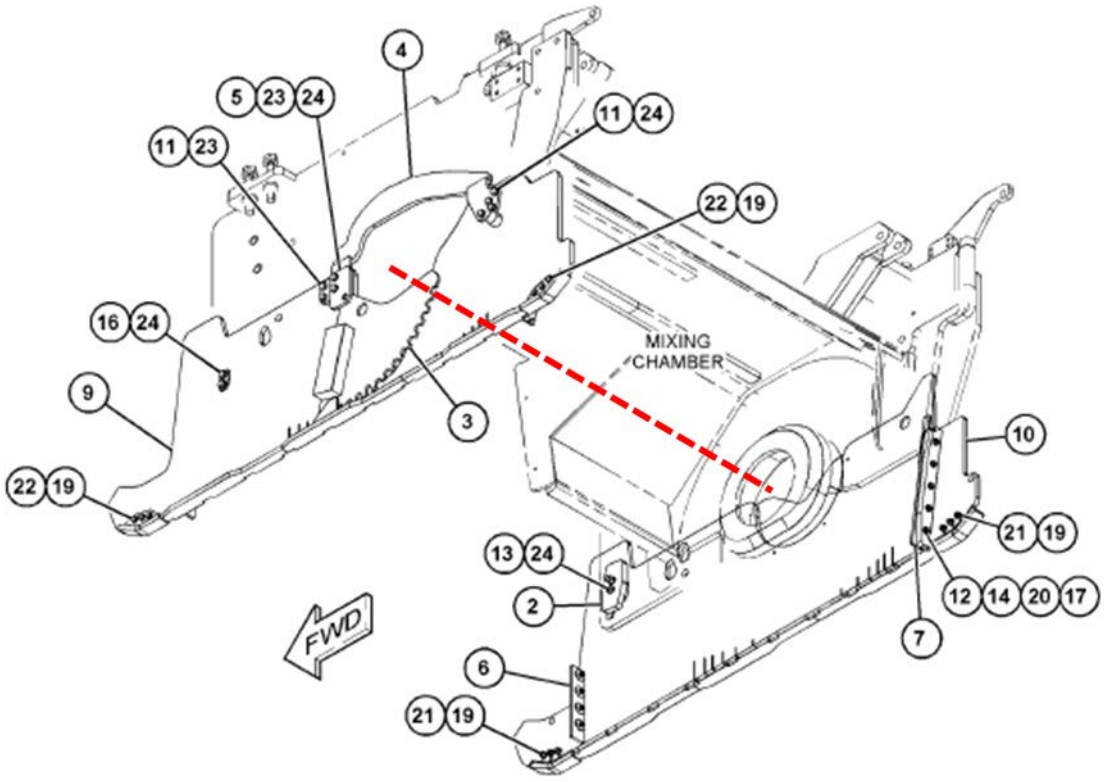
a swiveling actuator separate from the lifting actuator, the swiveling actuator being connected between the upper part of the scraper blade and a fixed part fixed relative to the machine frame, the swiveling actuator being configured to extend to pivot the scraper blade upward about a swiveling axis parallel to and spaced apart from the milling axis drum.

240. As discussed previously, the Infringing Products are construction machines, with a machine frame and a milling drum (e.g., Ex. 20 at 636, 638).

241. The milling drum connects to the frame via a drum casing and rotates about a milling drum axis that runs perpendicular to the length of the machine, as illustrated below by the dashed red line.

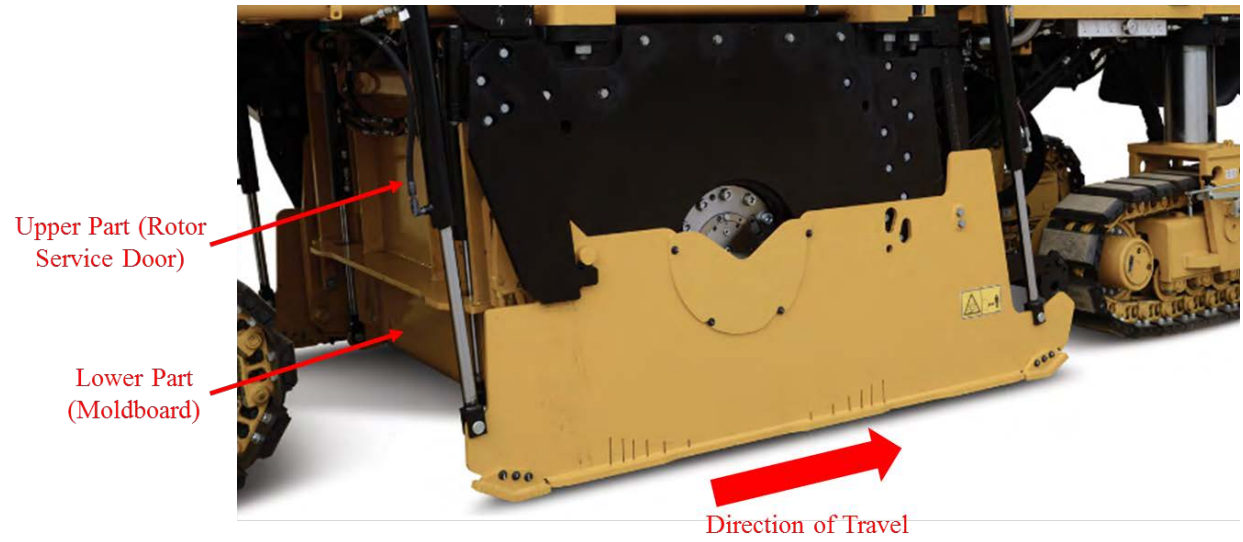


(Ex. 20 at 10.) The figure below is a schematic cutaway wherein the milling drum has been removed with the milling drum axis again illustrated by a dashed red line.



(Ex. 21 at 636.)

242. The Infringing Products include a scraper blade positioned behind the milling drum. When in milling mode, the scraper blade extends generally vertically downward behind the milling drum, whereas, when traveling in reverse, the scraper blade travels ahead of the drum. As depicted below, the scraper blade comprises a distinct upper part ("rotor service door"; top red arrow) and a lower part ("moldboard"; bottom red arrow).



(Ex. 20 at 10.) The lower part of the scraper blade is movable in a sliding non-pivotal motion relative to the upper part.

The moldboard is attached to the rotor service door. The moldboard slides up and down relative to the rotor service door. The rotor service door can be

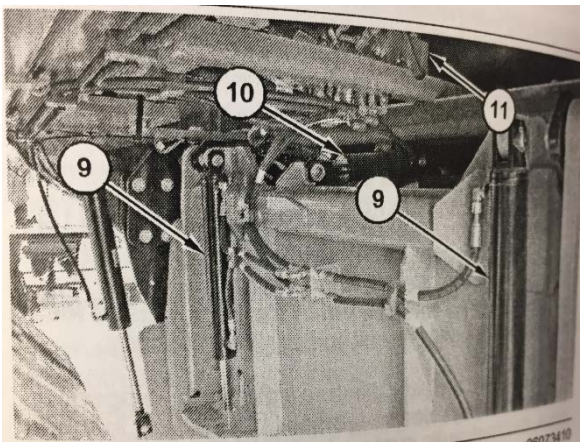
(Ex. 24 at 10.)

243. The Infringing Products extend and retract the moldboard relative to the upper part via piston-cylinder actuators connected between the upper and lower parts.

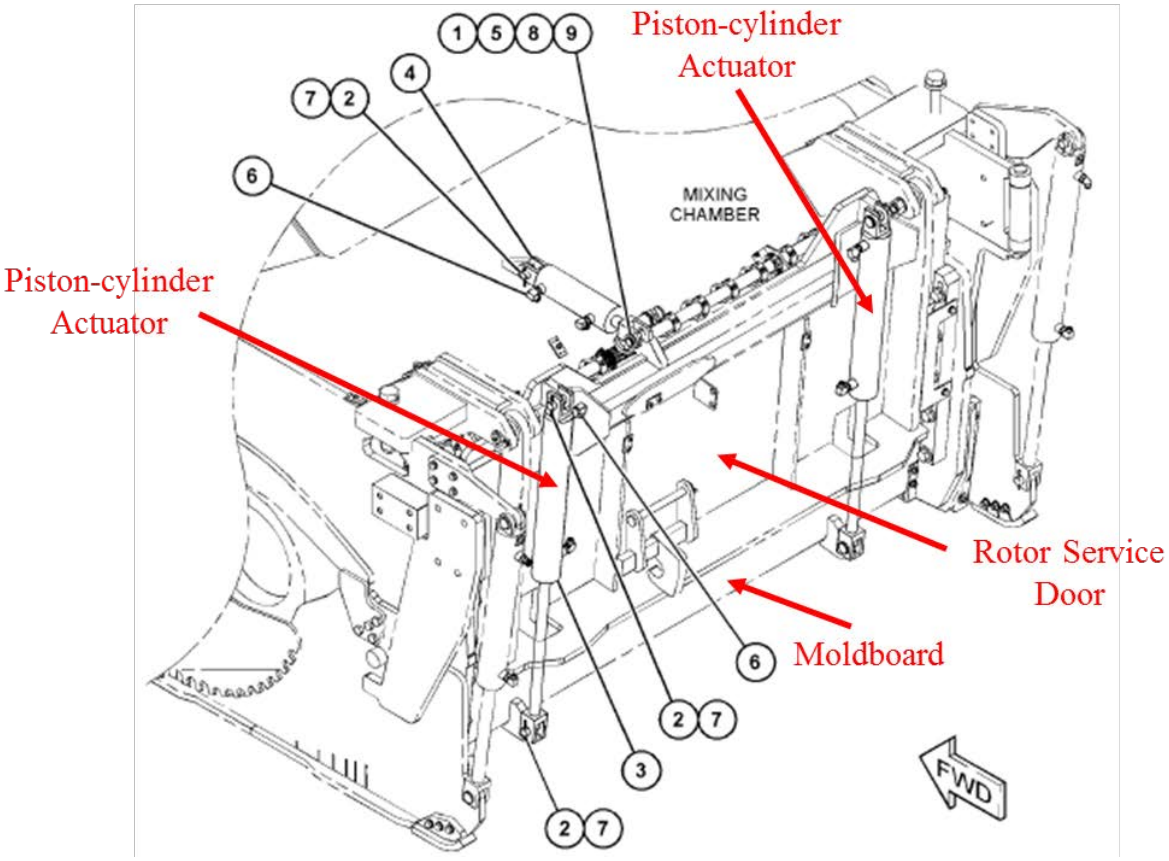
Two moldboard cylinders (9) are on the left and right sides of the machine. The moldboard cylinders are mounted to the rotor service door.

Moldboard cylinders (9) hydraulically adjust the height of the moldboard and maintain down pressure during the milling operation. During normal operation, the moldboard cylinders act in unison.

(Ex. 23 at 25.)



(Ex. 23 at 24.) As seen below, two piston-cylinder actuators, designated "3", are on the left and right sides of the scraper blade. Each cylinder is connected to the rotor service door at one end and the moldboard at the other. The actuators hydraulically adjust the height of the moldboard relative to the rotor service door.

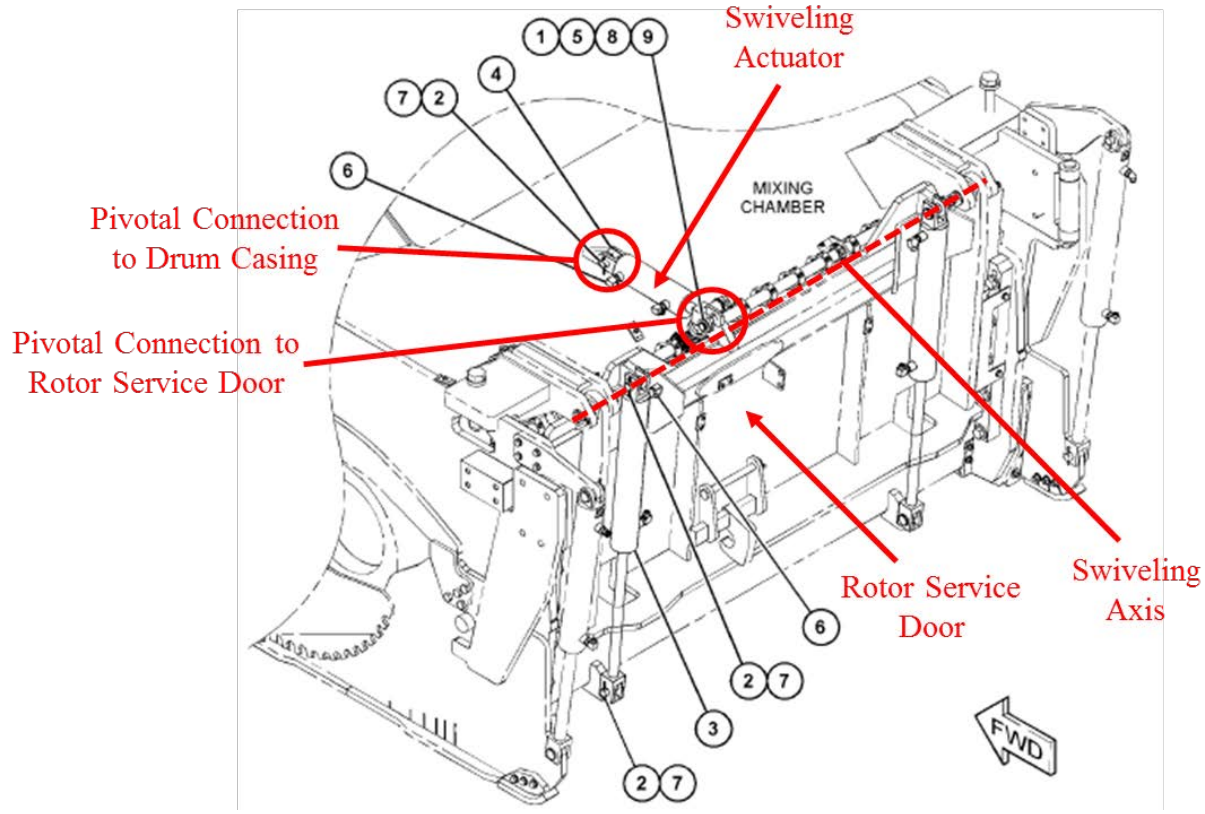


(Ex. 21 at 483.)

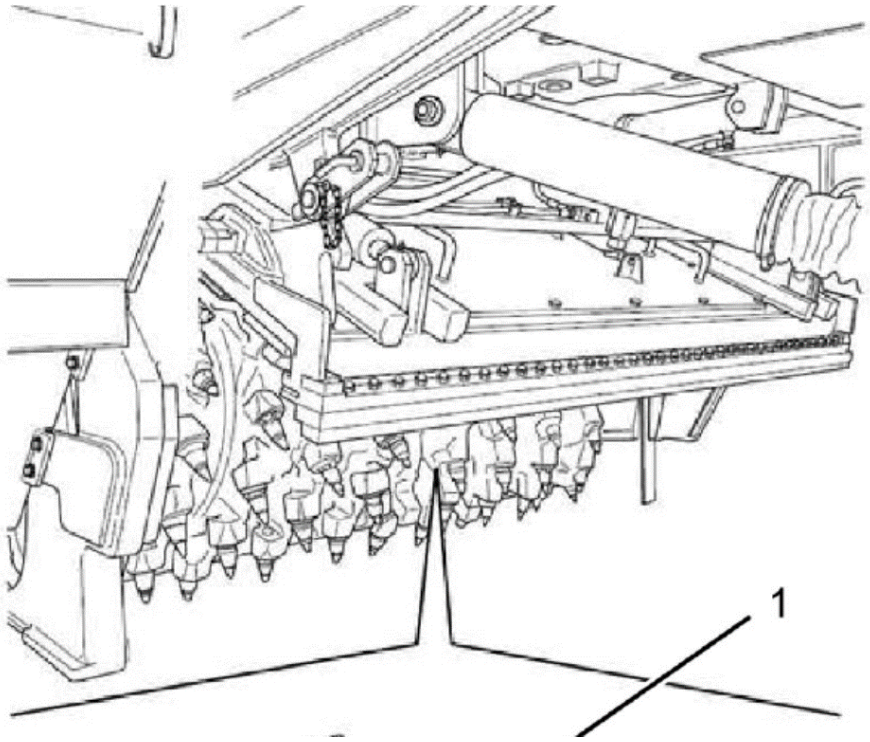
244. A separate piston-cylinder actuator connected between the upper part of the scraper blade and the drum casing of the machine frame extends to pivot the scraper blade upward about a swiveling axis parallel to and spaced apart from the milling drum axis.

Rotor service door cylinder (10) is located above the rotor chamber. This cylinder opens and closes the rotor service door when certain parameters are met. The moldboard must be raised fully past mechanical interlocks before the rotor service door cylinder can open the door.

(Ex. 23 at 25.) Specifically, when the rotor service door OPEN command is generated, "oil flows to the head end of the rotor service door cylinder," causing it to extend. (Ex. 23 at 19.) The rotor service door cylinder is pivotally mounted by pin joints (1) to the drum casing of the machine frame by a pin joint and (2) to the rotor service door. The swiveling axis parallel to the milling drum axis (dashed red line) results from the pivotal mounting of the rotor service door to the drum casing of the machine frame via pin joints.



(Ex. 21 at 483.) The figure below illustrates the position of the scraper blade as it is being swiveled about the swiveling axis, e.g., for servicing of the milling drum.



(Ex. 22 at 182).

245. Accordingly, all the claim limitations of claim 1 of the ’340 patent are met by the Infringing Products.

246. Caterpillar has made profits from its acts of patent infringement, and Plaintiff has suffered damages for which it is entitled to relief under 35 U.S.C. § 284.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff requests judgment against Caterpillar Inc. as follows:

A. That Caterpillar Inc. and all of its subsidiaries, affiliates, officers, agents, servants, employees, attorneys, and their heirs, successors and assigns, and all persons acting in concert or participation with it and each of them, be immediately enjoined and restrained, preliminarily and permanently, without bond, from manufacturing, distributing, selling or offering for sale in the United States or importing into the United States products infringing the claims of the patents-at-issue; and deliver to Plaintiff all products that infringe the patents-at-issue;

B. A judgment by the Court that Caterpillar has infringed U.S. Patent Nos. 7,828,309; 8,118,316; 7,530,641; 8,113,592; 9,010,871; 9,656,530; 8,308,395; 7,946,788; 8,511,932; 8,690,474; 9,624,628; and 9,644,340;

C. An award of damages for infringement of U.S. Patent Nos. 7,828,309; 8,118,316; 7,530,641; 8,113,592; 9,010,871; 9,656,530; 8,308,395; 7,946,788; 8,511,932; 8,690,474, 9,624,628; and 9,644,340 together with prejudgment interest and costs, said damages to be trebled by reason of the intentional and willful nature of Caterpillar's infringement, as provided by 35 U.S.C. § 284;

D. A determination that this case is "exceptional" under 35 U.S.C. § 285, and an award of Plaintiff's reasonable attorneys' fees;

E. That any monetary award includes pre- and post-judgment interest at the highest rate allowed by law;

F. For costs of suit; and,

G. For such other or further relief as the Court deems just and proper.

DEMAND FOR TRIAL BY JURY

Plaintiff, pursuant to Rule 38 of the Federal Rules of Civil Procedure, respectfully demands a trial by jury of any issues triable of right by a jury.

MORRIS, NICHOLS, ARSHT & TUNNELL LLP

/s/ Maryellen Noreika

Maryellen Noreika (#3208)
1201 North Market Street
P.O. Box 1347
Wilmington, DE 19899
(302) 658-9200
mnoreika@mnat.com

Attorneys for Plaintiff

OF COUNSEL:

John F. Triggs
Ryan D. Levy
Seth R. Ogden
PATTERSON INTELLECTUAL PROPERTY LAW, P.C.
Roundabout Plaza, Suite 500
1600 Division Street
Nashville, TN 37203
(615) 242-2400

June 16, 2017